PB83-214643

Diesel Particulate by 1986 HD (Heavy Duty) Transient Federal Test Procedure

Southwest Research Inst., San Antonio, TX

Prepared for

Engine Manufacturers Association, Chicago, IL

Oct 81

U.S. Department of Commerce
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16. ABSTRACT

Three Heavy Duty Engines were tested as part of a joint Environmental Protection-Engine Manufacturers Association cooperative program to cross-check the particulate and gaseous emissions from heavy-duty diesel engines. The following tests were performed on each engine: 13-mode, 6-mode, 11-mode Federal Test Procedure (FTP) and 1984 Transient Federal Test. Particulate samples were taken on all of the tests. Exhaust emissions were also measured on the complete 13-mode and the transient tests. Also included is the summary charts of the test data from each specific engine tested.

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DIESEL PARTICULATE BY 1986 HD TRANSIENT FEDERAL TEST PROCEDURE

by

Sherrill F. Martin

FINAL REPORT

for

Engine Manufacturers Association
One Illinois Center
111 East Wacker Drive
Chicago, IL 60601

October 1981

SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO HOUSTON

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DIESEL PARTICULATE BY 1986 HD TRANSIENT FEDERAL TEST PROCEDURE

JOINT EMA-EPA COOPERATIVE PROGRAM SwRI TESTS

by

Sherrill F. Martin

FINAL REPORT

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i.b

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I. INTRODUCTION

Exhaust emissions from diesel engines used in heavy-duty trucks and buses are planned by the U.S. Environmental Protection Agency (EPA) to be measured using a new transient cycle test procedure.[1,2,3]* The procedure has been under active development by the Department of Emissions Research at Southwest Research Institute (SwRI) on behalf of EPA for the past two years. A data base for a variety of diesel engines was also obtained to assist EPA in preparing a recommended procedure for use in future regulations.

The Engine Manufacturers Association (EMA) initiated a program to measure and analyze lab-to-lab variations in particulate emissions measurements. In addition, EMA hoped to gain other data in preparation for hearings on particulates and NO_x.

On May 8, 1981, Proposal 11-2881 entitled "Diesel Particulate by 1985 HD Transient Federal Test Procedure", was submitted to Mr. Thomas C. Young of the EMA. This proposal was in response to a letter from Mr. Young dated May 1, 1981. The proposal was accepted and authorization to proceed with the SwRI portion of the program was given by Mr. Young on June 2, 1981. The laboratory tests commenced on July 1, 1981 and were completed on August 20, 1981. The program was known as SwRI Project 05-6598-001.

The program became a cooperative effort with the addition of funding from the Environmental Protection Agency (EPA). This funding, which was derived from the SwRI/EPA Diesel baseline project (EPA Contract No. 68-03-2603) made it possible to test three engines instead of two. It was agreed that the final report would be directed to the EMA, with copies to the EPA. The EPA contact for the joint cross-check program was Mr. John McGuckin of EPA Ann Arbor, Michigan. The EMA contact was Mr. Lou Broering of Cummins Engine Company, Columbus, Indiana.

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*Numbers in parentheses refer to references at the end of this report.

II. SUMMARY

Three engines were tested as part of a joint EPA-EMA cooperative program to cross-check the particulate and gaseous emissions from heavy-duty diesel engines. The following tests were performed on each engine:

- 13-mode 1979 FTP
- Mode 6 from 1979 FTP
- Mode 11 from 1979 FTP
- 1984 Transient FTP

Particulate samples were taken on all tests. HC, CO, CO_2, and NO_x were measured on the complete 13-mode test and the transient tests. Percent soluble organics were determined from selected particulate filters. Following is a brief summary of the test data from each engine (Tables 1 and 2).

TABLE 1. EMISSIONS TEST SUMMARY

	13-Mode					Mode 6	Mode 11	Transient					
										Bag	Cont.		
	HC	CO	NO_x	Part.	BSFC	Part.	Part.	HC	CO	NO_x	NO_x	Part.	BSFC
Cummins	0.92	1.88	6.22	0.38	0.410	0.27	0.77	2.23	2.00	4.36	5.59	0.67	0.457
DDA	0.68	2.05	8.97	0.25	0.420	0.22	0.38	0.73	2.28	6.69	7.91	0.44	0.448
IH	0.77	2.16	3.86	0.53	0.485	0.51	0.95	0.87	2.35	3.67	4.41	0.62	0.505

TABLE 2. ORGANIC EXTRACTIONS
(Percent Soluble)

	Transient Cold	Transient Hot	Steady State M-6	Steady State M-11
Cummins	47%	34%	10%	18%
DDA	42%	40%	27%	34%
IH	42%	26%	8%	18%

III. TEST PLAN, ENGINES, AND FUEL

This section describes the test plan, engines and fuel used in this program.

A. Test Plan

The test plan for the SwRI portion of this cross-check program was defined in SwRI letter proposal 11-2881 submitted to Mr. Thomas Young of EMA by Mr. Karl J. Springer. It is reproduced in Table 3.

The thirteen-mode particulate test was performed simultaneously with the gaseous emissions test. No established procedure exists for a thirteen-mode particulate test. Initial communications resulted in agreement to sample only during a five-minute period of each mode. This would eliminate the influence of transitions between modes. The SwRI facility has this capability. A solenoid-controlled cap can be operated by the test-cell operator. This procedure was used on the Cummins VTB-903. Later conversations revealed that Cummins was the only manufacturer which had the capability of stopping and starting particulate sampling during testing. Therefore, thirteen-mode particulate tests on the Detroit Diesel and International Harvester engines included sampling during transitions between modes. Because this resulted in more than sixty-five minutes of sampling, the total sampling time was used in computing the grams/horsepower-hour figure.

B. Engines Tested

By agreement with EPA, three engines were tested at SwRI as part of the EMA/EPA Cooperative Test Program. EMA provided funds for testing two engines, while EPA funded the remaining one.

The three engines tested were:

1. Cummins VTB-903 S/N 10889290

2. DDA 8V-71TA S/N 8VA-334526

3. IHC DTI-466B S/N 149833

All arrived in good condition. Other than an accessory failure on the Cummins engine, no problems were encountered.

C. Fuel

The fuel used for all engines was Phillips Diesel Control Fuel D-2 Lot C-345. The analysis, provided by the refiner, is shown in Table 4.

TABLE 3. TEST PLAN-3 ENGINE TRANSIENT PARTICULATE

Step	
1.	Install engine as-received and provided by EMA, on Cell 5 stationary dynamometer facility. Adjust inlet/exhaust restrictions as specified by EMA.
2.	Perform 1 each 13-mode test per 1979 Federal Test Procedure (FTP). Collect single composite particulate sample by taking diluted (CVS) sample continuously for each 5 minute mode. If 13-mode data is satisfactory, continue to next step.
3.	Collect particulate sample at peak torque speed-full load using diluted exhaust CVS.
4.	Repeat Step 3 but at rated speed and 25 percent load.
5.	Adjust engine inlet/exhaust restrictions for transient cycle test and run power curve. Prepare tape and run trial test to assure statistics. Complete preparations for transient cycles. Measure inlet and exhaust restrictions continuously during the power curve.
6.	Run 1 cold- and six hot-start transient cycles in succession.
7.	Repeat Step 6 on following day.
8.	Determine percent soluble organics on 90 mm filter taken during Steps 3 and 4. Determine percent organics also from 1 cold-start filter and 1 hot-start test.
9.	Repeat Steps 1-8 for the second engine.
10.	Prepare final report to include pre-test and test results of: a. gaseous and particulate emissions b. cycle fuel consumption c. propane check d. carbon balance e. max tunnel temperature at the sampling zone using a 1/8" sheathed thermocouple f. emission background levels g. intake air humidity h. type of dilution system (1 stage or 2 stage) i. CVS type (CFV, PDP, etc.) j. comment on test setup and include necessary schematics

TABLE 4. TEST FUEL ANALYSIS

DIESEL CONTROL FUEL D-2

LOT C-345

Test	Results	Specification	ASTM Method
Cetane	47.8	$\geq$ 45	D976-66
Distillation			D86
IBP, °F	385	340-400	
10 percent point, °F	434	400-460	
50 percent point, °F	507	470-540	
90 percent point, °F	570	550-610	
EP, °F	599	580-660	
°API Gravity	34.8	33-37	D287
Total sulfur, weight percent	0.3	0.2-0.5	D3120
Hydrocarbon composition, LV%			D1319
Aromatics	30	33 desired +2	
Paraffins / Naphthenes	65		
Olefins	5	Remainder	
Flash Point, °F	175	$\geq$ 130	D93
Viscosity, cst	2.56	2.0-3.2	D445
Particulate matter, mg/l	2.14	-	D2276

IV. DESCRIPTION OF FACILITY

This section describes the dynamometer and engine controls, environmental controls, and the exhaust dilution system used in the program.

A. Dynamometer and Controls

The overall control scheme for the transient tests consists of two independent closed loop systems. The speed is controlled by the dynamometer, and the torque by the engine. To obtain transient command signals, a paper tape reader and digital to analog programmer are used. These provide continuous analog output, redirected at one-second intervals.

The dynamometer system consists of a G. E. Type TLC-2564H D.C. dynamometer and a Midwest Type 1519W eddy current dynamometer, arranged on a common shaft. The G. E. dynamometer has a capacity of 200 horsepower motoring and 250 horsepower absorbing. The Midwest dynamometer has an absorbing capacity of 500 horsepower. A control circuit progressively turns on the eddy current dynamometer as the absorbing load increases on the D. C. dynamometer.

The torque control loop consists of the following main elements:

- Analog command signal
- Servo amplifier
- Servomotor attached to throttle
- Driveshaft torquemeter
- Strain gage conditioner

The analog command signal is fed to the torque command input of the servo amplifier. The signal from the strain conditioner goes to the torque feedback input. An error amplifier decides the direction and magnitude of the current to the throttle servomotor. General views of the test stand are shown in Figures 1 and 2.

B. Environmental Controls

The diesel test cell has two environmental control systems. The first is a wall-mounted air conditioner which insures that the test cell is the proper temperature for an overnight cold soak. A second system provides conditioned air directly to the engine intake. Filtered air from outside the building is passed through a chilled water spray chamber to establish the proper absolute humidity level. The air then passes through a demister followed by an electrically heated reheat section to establish a 77°F inlet temperature. Fuel supply is maintained at 90°F by a heated return tank in the test cell.

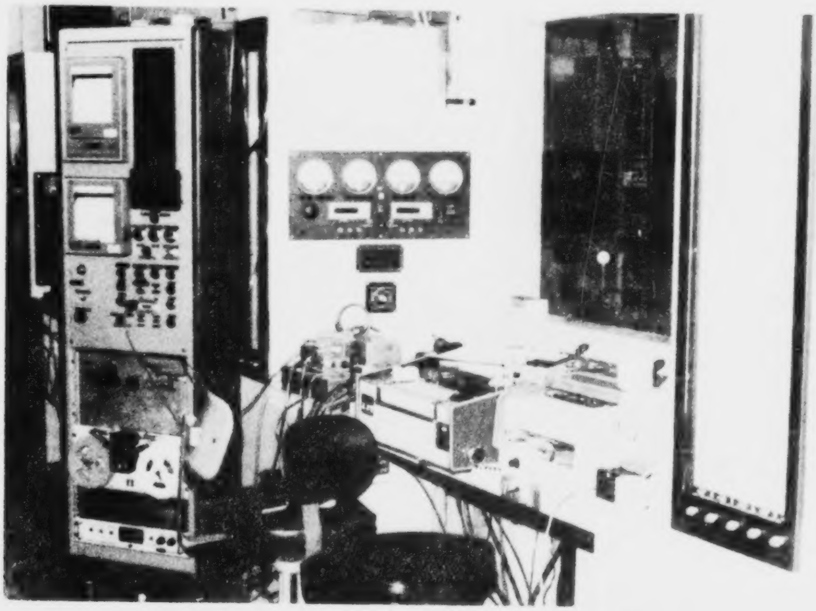

Figure 1. Diesel test stand console

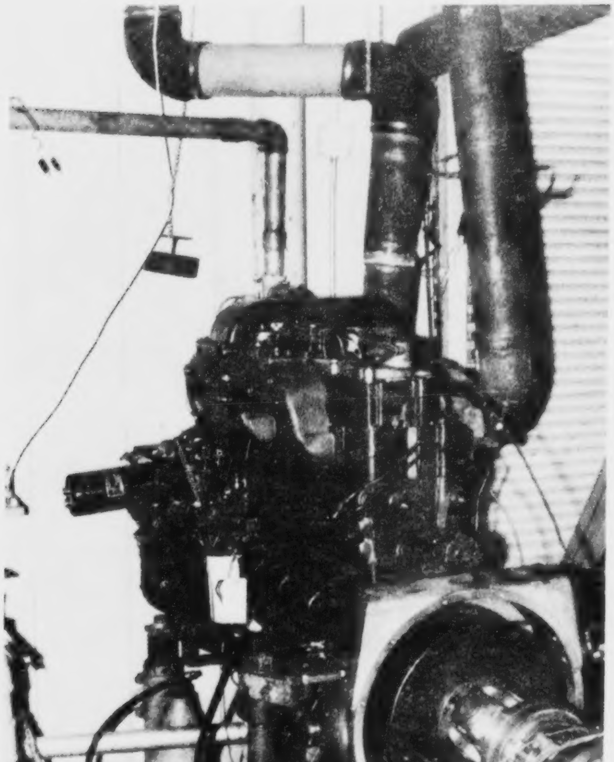

Figure 2. Mounted engine with driveshaft torquemeter

C. Exhaust Dilution System

The exhaust dilution system is a double dilution system with two secondary tunnels. It can simultaneously provide dilute gaseous samples and accumulate particulate on filters, both at appropriate dilutions for accurate measurement. The entire system is the positive displacement pump (PDP) design of constant volume sampling (CVS) system. Total flow capacity of the main tunnel is 6000 cfm, variable in steps of 1000 cfm.

The overall configuration of the CVS system is shown in Figure 3. The main tunnel is conventional, but scaled up from light-duty practice. The 90 mm secondary tunnel is used for quantitative particulate measurements. Particulate samples are taken in accordance with the Particulate Regulation for Heavy-Duty Diesel Engines.(1) Two Pallflex 90 mm filters are used in series. The 20x20 inch filter system is for large sample collection and was not used in this study. Views of the primary and secondary dilution tunnels are shown in Figures 4 and 5. Other details of the emissions measuring system are given in Figures 6 and 7.

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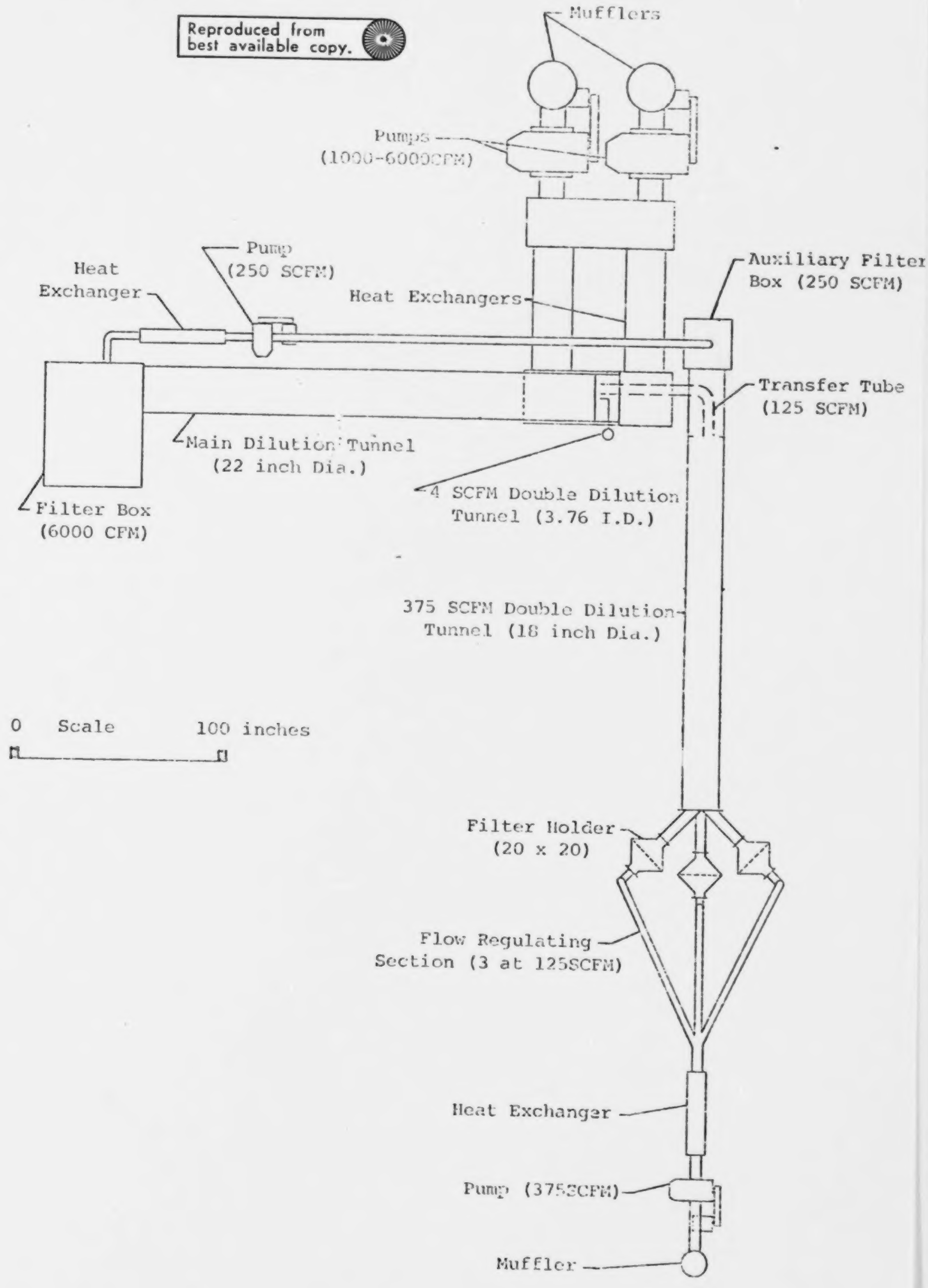

Fig. 3. Basic layout of Transient Cycle Heavy-Duty Diesel CVS with large double dilution sampler for three 20 x 20 filters

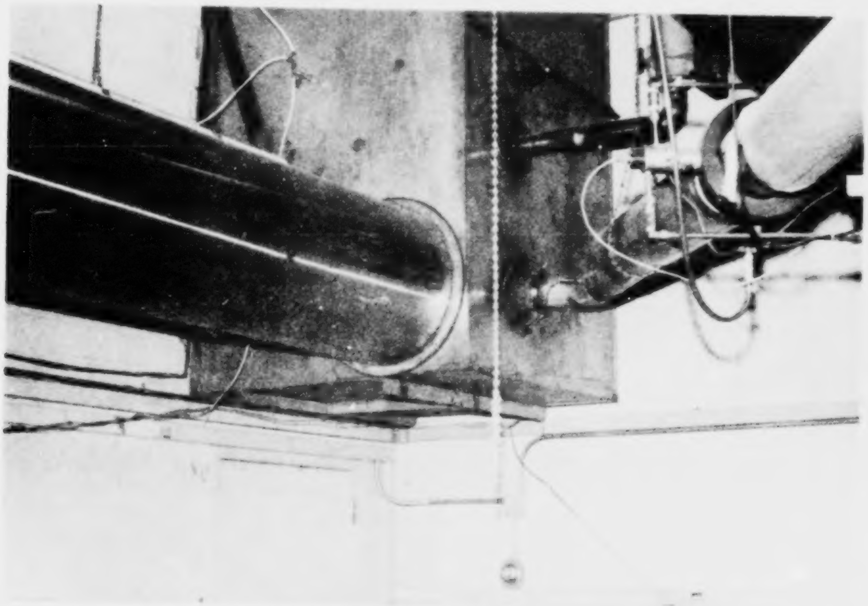

Figure 4. Primary dilution tunnel for EPA transient HD cycle

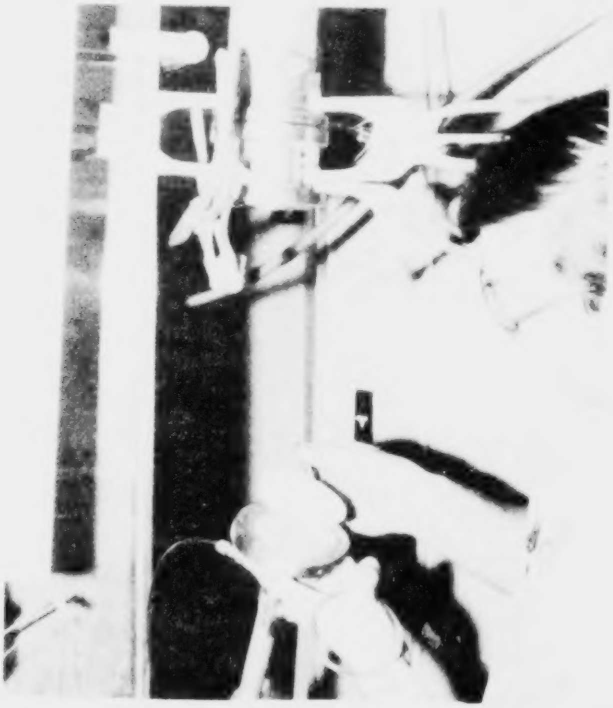

Figure 5. Installation of new particulate filter on secondary tunnel (EPA Transient) HD Cycle)

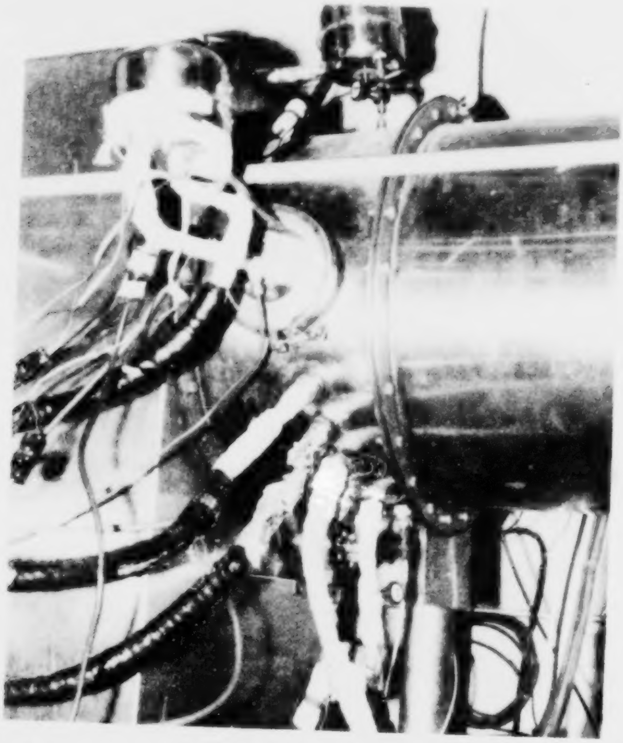

Figure 6. Heated probe filter and transfer for HC and NO_x continuous sampling

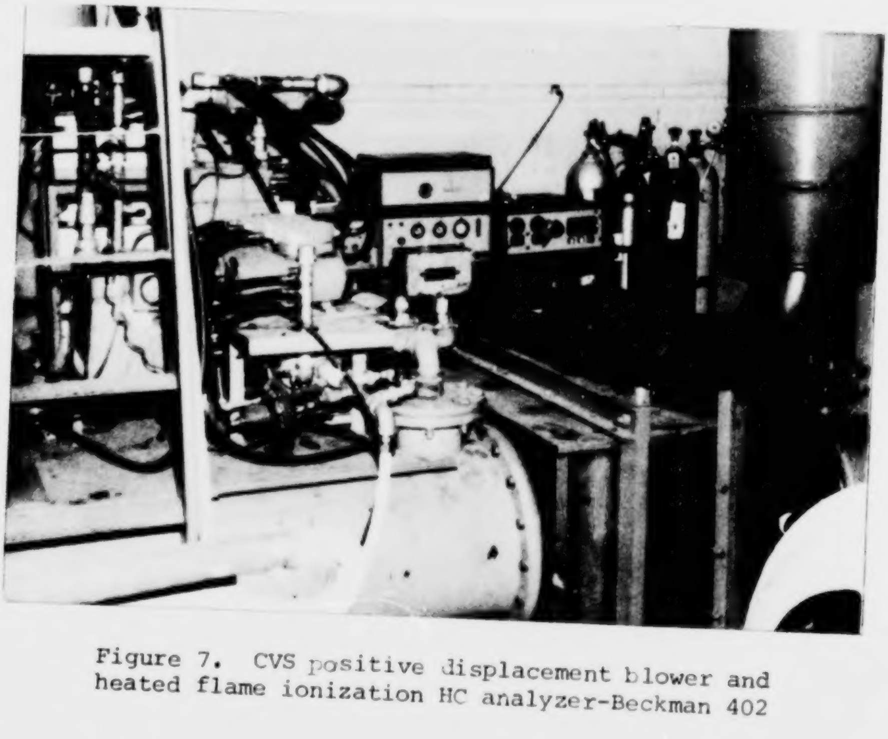

Figure 7. CVS positive displacement blower and heated flame ionization HC analyzer-Beckman 402

V. RESULTS

This section presents the completed Emission Summaries on the forms provided by the EMA. Computer printouts showing more details of the SwRI emissions measurements will be found in the Appendix.

A. CUMMINS VTB-903

Testing on the VTB-903 proceeded in a very straightforward fashion. One continuous NO_x measurement (Test D29-1H2) was discarded because it was abnormally low, while the corresponding bag NO_x value was consistent with the other hot starts.

EMA/EPA COOPERATIVE TEST PROGRAM

EMISSION SUMMARY

ENGINE Cummins TEST SITE SwRI TEST PERIOD July

	TRANSIENT EMISSIONS			STEADY STATE EMISSIONS		
NOx	COLD	HOT	COMPOSITE	13-MODE	MODE-6	MODE-11
MEAN ($\bar{x}$) GM/BHP HR.	4.75	5.70	5.59	6.22	—	—
STD. DEV. (s)	0.14	0.22	—	—	—	—
$S/\bar{X}$ x 100%	2.96	3.92	—	—	—	—
SAMPLE SIZE	2	11	—	1	—	—
HC						
MEAN ($\bar{x}$) GM/BHP HR.	4.42	1.87	2.23	0.92	—	—
STD. DEV. (s)	0.24	0.09	—	—	—	—
$S/\bar{X}$ x 100%	5.44	4.98	—	—	—	—
SAMPLE SIZE	2	12	—	1	—	—
PARTICULATE						
MEAN ($\bar{x}$) GM/BHP HR.	1.02	0.61	0.67	0.38	—	—
STD. DEV (s)	0.01	0.02	—	—	—	—
$S/\bar{X}$ x 100%	0.70	2.59	—	—	—	—
SAMPLE SIZE	2	12	—	1	—	—

	TRANSIENT SMOKE		
	ACCEL	LUG	PEAK
MEAN ($\bar{x}$) % OPACITY	—	—	—
STD. DEV. (s)	—	—	—
$S/\bar{X}$ x 100%	—	—	—
SAMPLE SIZE	—	—	—

COMMENTS:

EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: [illegible] TEST DATE: July 8 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D37-1							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	(4.85)	(5.45)	–	(5.01)	(5.55)	(5.63)	(5.41)
HC GM/BHP-HR	(4.35)	(1.80)	(1.80)	(1.81)	(1.86)	(1.88)	(1.88)
CO GM/BHP-HR	2.44	1.88	1.89	1.89	1.96	1.80	1.86
CO_2 GM/BHP-HR	691	650	654	644	657	647	648
PARTICULATES GM/BHP-HR	1.01	0.64	0.61	0.60	0.64	0.63	0.62

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
NO_x							
BACKGROUND CONC. (PPM)	1	1	1	1	1	1	1
BAG CONC. (PPM)	28	31	31	32	31	31	31
BAG CONC-CORRECTED (PPM)	27	30	30	31	30	30	30
BAG MASS-CORRECTED (GMS)	65	72	71	73	72	72	70
CO							
BACKGROUND CONC. (PPM)	1	0	1	1	1	0	1
BAG CONC. (PPM)	36	23	23	24	24	22	23
BAG CONC-CORRECTED (PPM)	35	23	22	23	23	22	22
BAG MASS-CORRECTED (GMS)	48	31	31	31	32	29	30
CO_2							
BACKGROUND CONC. (PPM)	0.04	0.05	0.04	0.05	0.04	0.05	0.04
BAG CONC. (PPM)	0.55	0.53	0.52	0.52	0.52	0.52	0.51
BAG CONC-CORRECTED (PPM)	0.51	0.48	0.48	0.47	0.48	0.47	0.47
BAG MASS-CORRECTED (GMS)	11260	10647	10735	10551	10726	10552	10592
HC							
BACKGROUND CONC. (PPM)	10	9	7	7	7	6	10

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D22-1							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	109	51	50	50	50	50	53
CORR. CONC. (PPM)	99	42	43	43	43	44	45
CORR. MASS (GMS)	69	30	29	30	30	31	31
NO_x							
CONC. (PPM)	34	39	36	40	39	40	39
CORR. CONC. (PPM)	33	38	35	39	39	39	38
CORR. MASS (GMS)	79	89	81	92	91	92	89
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	42667	42657	42665	42645	42667	42633	42608
LBS	–	–	–	–	–	–	–
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	75	78	76	78	77	77	[illegible]
HUMIDITY (GRAINS)	76	86	74	86	78	83	78
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	571	571	571	571	571	571	571
....							
....							
....							
....							

8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: Cummins TEST DATE: July 8 1981

TEST SITE: SwRI

COMMENTS: ________

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D29-1							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	286.736	278.413	284.314	268.[illegible]2	279.567	277.165	278.047
TARE WT. (MG)	277.710	272.253	278.330	262.655	273.303	271.030	272.135
PARTICULATE MASS (MG)	9.026	6.160	5.984	5.377	6.264	6.075	5.912
SECONDARY FILTER							
LOADED WT. (MG)	263.482	269.262	264.765	264.105	267.644	260.930	283.553
TARE WT. (MG)	262.548	268.935	264.475	263.747	267.274	260.638	283.233
PARTICULATE MASS (MG)	0.934	0.327	0.290	0.358	0.370	0.342	0.320
TOT. PART. MASS (MG)	9.960	6.487	6.274	6.235	6.634	6.417	6.232
PRIMARY FILTER EFF. (%)	91	95	95	94	94	95	95
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	80	86	90	91	92	93	94
HUMIDITY (GRAINS)/LB	76	86	74	86	78	83	78
INLET FLOW (SCF)	1.84	1.83	1.81	1.82	1.81	1.81	1.81
PEAK SAMPLE ZONE TEMP. (°F)	189	187	187	187	187	187	187
FLOW THROUGH FILTER (SCF)	3.14	3.15	3.16	3.15	3.15	3.13	3.1[illegible]
PEAK FILTER TEMP (°F)	93	97	99	99	100	102	102
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOULBLE ORGANIC FRACTION (%)	47	34	—	—	—	—	—
....							
....							
....							
....							

EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: Cummins

TEST DATE: July [illegible]

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D29-1							
BARO PRESS. (IN-HG)	29.35	29.34	29.35	29.35	29.35	29.33	29.32
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)/LB							
AVG	89	85	88	85	82	82	81
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	77	77	77	77	77	77	77
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	—	—	—	—	—	—	—
CALCULATED (LBS)	7.94	7.43	7.48	7.36	7.47	7.36	7.5[illegible]
CARBON BALANCE ERROR (%)	—	—	—	—	—	—	—
CYCLE WORK (BHP-HR)	16.30	16.37	16.40	16.39	16.34	16.32	16.35
CYCLE BSFC (LB/BHP-HR)	0.488	0.453	0.456	0.449	0.458	0.451	0.452
CYCLE START OIL SUMP TEMP (°F)	77	170	170	170	170	170	170
CYCLE START TIME (HH-MM-SS)	—	—	—	—	—	—	—
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		—	—	—	—	—	—
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: Cummins   TEST DATE: July 8, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D27 1	—	—	—	—	—	—	—	
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176	
SLOPE	1.003	1.000	1.001	.999	1.001	.998	.999	.97-1.03
Y-INTERCEPT	-2	2	2	2	1	3.	5	±50 RPM
STD. ERROR	50	49	47	46	46	48	49	100 RPM
COEFF. OF DET.	.9928	.9929	.9936	.9937	.9940	.9931	.9930	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	951	964	963	963	963	966	967	
SLOPE	.954	.943	.941	.938	.942	.940	.939	.77/.83-1.03
Y-INTERCEPT	-9.0	-2.8	-1.2	1.6	-.4	-4.5	-3.9	±15 FT-LBS
STD. ERROR	5.%	5.%	5.%	5.%	4.%	6.%	6.%	13%
COEFF. OF DET.	.9696	.9660	.9727	.9754	.9970	.9600	.9573	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	951	964	963	963	963	966	967	
SLOPE	.984	.999	.999	.976	.999	.973	.973	.87/.89-1.03
Y-INTERCEPT	-1.9	-1.9	-1.2	-.9	-.9	-2.0	-2.0	±5 BHP
STD. ERROR	4.%	4.%	4.%	4.%	3.%	5.%	5.%	8%
COEFF. OF DET.	.9992	.9985	.9828	.9844	.9853	.9941	.9753	.91 MIN.

TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	16.30	16.37	16.40	16.39	16.34	16.32	16.35	-15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	17.79	17.79	17.79	17.79	17.79	17.79	17.79	
ACTUAL/REF. RATIO.	-3.4	-8.0	-7.8	-7.9	-8.2	-8.3	-8.1	
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EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: Cummins

TEST DATE: July 9, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D29-2							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	(5.07)	(5.75)	(6.10)	(6.02)	(5.91)	(5.66)	(5.62)
HC GM/BHP-HR	(4.61)	(1.93)	(1.90)	(1.79)	(1.71)	(1.92)	(2.12)
CO GM/BHP-HR	2.56	1.81	1.81	1.85	1.89	1.84	1.85
CO_2 GM/BHP-HR	679	652	650	642	650	651	642
PARTICULATES GM/BHP-HR	1.02	0.62	0.59	0.60	0.60	0.62	0.51

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

NO_x	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	0	0	0	0	1	1	1
BAG CONC. (PPM)	30	32	32	32	33	32	33
BAG CONC-CORRECTED (PPM)	30	32	32	32	32	31	32
BAG MASS-CORRECTED (GMS)	69	74	73	73	75	73	74

CO	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	1	0	0	1	1	1	1
BAG CONC. (PPM)	37	22	22	24	24	23	23
BAG CONC-CORRECTED (PPM)	36	22	22	23	23	22	22
BAG MASS-CORRECTED (GMS)	48	30	30	31	31	31	31

CO_2	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	0.04	0.05	0.04	0.04	0.04	0.04	0.05
BAG CONC. (PPM)	0.55	0.53	0.52	0.52	0.53	0.53	0.53
BAG CONC-CORRECTED (PPM)	0.51	0.48	0.48	0.48	0.49	0.49	0.49
BAG MASS-CORRECTED (GMS)	11372	10565	10662	10673	10768	10879	10676

HC	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	6	7	6	6	5	5	5

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D27.2	___	___	___	___	___	___	___
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	118	53	51	48	47	51	55
CORR. CONC. (PPM)	112	46	45	42	42	46	50
CORR. MASS (GMS)	77	32	31	30	30	32	35
NO_x							
CONC. (PPM)	37	41	43	43	43	41	41
CORR. CONC. (PPM)	37	41	43	43	42	40	40
CORR. MASS (GMS)	85	96	100	100	98	95	94
CO							
CONC. (PPM)	___	___	___	___	___	___	___
CORR. CONC. (PPM)	___	___	___	___	___	___	___
CORR. MASS (GMS)	___	___	___	___	___	___	___
CO_2							
CONC (PPM)	___	___	___	___	___	___	___
CORR. CONC (PPM)	___	___	___	___	___	___	___
CORR. MASS (GMS)	___	___	___	___	___	___	___
DILUTION FACTOR	___	___	___	___	___	___	___
CVS SYSTEM							
TOTAL FLOW SCF	42544	42731	42639	42699	42693	42691	42672
LBS	–	–	–	–	–	–	–
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	78	78	79	78	78	82	77
HUMIDITY (GRAINS)	103	98	90	97	97	102	90
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	571	571	[illegible]71	571	571	571	571
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: Cummins

TEST DATE: July ? 1??

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D29-2							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	272.443	269.235	270.195	278.537	271.096	276.472	267.470
TARE WT. (MG)	262.302	262.481	263.840	272.680	265.336	270.330	262.063
PARTICULATE MASS (MG)	10.141	6.304	6.355	5.857	5.760	6.142	5.407
SECONDARY FILTER							
LOADED WT. (MG)	231.905	266.000	261.525	273.860	263.711	265.570	275.910
TARE WT. (MG)	230.512	265.572	261.152	273.530	263.367	265.250	275.565
PARTICULATE MASS (MG)	1.393	0.428	0.373	0.330	0.344	0.320	0.345
TOT. PART. MASS (MG)	11.534	7.232	6.728	6.187	6.104	6.462	5.752
PRIMARY FILTER EFF. (%)	88	94	95	95	94	95	94
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	81	87	92	93	94	94	94
HUMIDITY (GRAINS)	103	93	90	97	97	102	90
INLET FLOW (SCF)	1.84	1.82	1.81	1.81	1.81	1.81	1.83
PEAK SAMPLE ZONE TEMP. (°F)	189	187	187	187	187	187	187
FLOW THROUGH FILTER (SCF)	3.28	3.32	3.29	3.14	3.13	3.15	3.14
PEAK FILTER TEMP (°F)	95	98	101	101	102	101	10[illegible]
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOLUBLE ORGANIC FRACTION (%)	—	—	—	—	—	—	—
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: Cummins

TEST DATE: July ?, 19[illegible]

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D29-2							
BARO PRESS. (IN-HG)	29.33	29.37	29.37	29.37	29.37	29.37	29.36
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)/LB							
AVG	80	84	81	80	82	82	81
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	74	76	77	77	79	77	77
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	—	—	—	—	—	—	—
CALCULATED (LBS)	8.08	7.59	7.43	7.44	7.51	7.59	7.46
CARBON BALANCE ERROR (%)	—	—	—	—	—	—	—
CYCLE WORK (BHP-HR)	16.81	16.66	16.40	16.62	16.57	16.72	16.67
CYCLE BSFC (LB/BHP-HR)	0.480	0.455	0.453	0.448	0.453	0.454	0.441
CYCLE START OIL SUMP TEMP (°F)	77	170	170	170	170	170	170
CYCLE START TIME (HH-MM-SS)	—	—	—	—	—	—	—
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		—	—	—	—	—	—
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: Cumm...

TEST DATE: July 1, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D21-2								
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176	
SLOPE	1.001	1.010	1.010	1.008	1.009	1.012	1.011	.97-1.03
Y-INTERCEPT	1.	2.	1.	2.	1.	0	-0	±50 RPM
STD. ERROR	52	47	46	47	45	45	47.	100 RPM
COEFF. OF DET.	.9921	.9937	.9937	.9937	.9941	.9940	.9937	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	947	948	952	948	963	964	954	
SLOPE	.976	.971	.961	.973	.968	.971	.973	.77/.83-1.03
Y-INTERCEPT	-9.1	-2.4	-2.6	-4.5	-5.5	-3.2	-5.6	±15 FT-LBS
STD. ERROR	6.%	4.%	3.%	4.%	5.%	4.%	5.%	13%
COEFF. OF DET.	.9555	.9843	.9867	.9807	.9758	.9713	.9766	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	947	943	952	948	963	964	954	
SLOPE	1.014	1.003	.995	1.007	1.006	1.009	1.003	.87/.89-1.03
Y-INTERCEPT	-2.5	-.7	-.6	-1.3	-1.8	-1.1	-1.7	±5 BHP
STD. ERROR	5.%	3.%	3.%	3.%	4.%	3.%	4.%	8%
COEFF. OF DET.	.9717	.9847	.9909	.9871	.9835	.9860	.9844	.91 MIN.

TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	16.81	16.66	16.40	16.62	16.57	16.72	16.67	-15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	17.79	17.79	17.79	17.79	17.79	17.79	17.79	
ACTUAL/REF. RATIO.	-5.5	-6.4	-7.8	-6.6	-6.9	-6.0	-6.3	
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B. DETROIT DIESEL 8V-71TA

The measured HC in test D30-1 was 25% lower than that in test D30-2. During the testing of the next engine, the heated HC sample line failed. It is believed that this problem occurred during test D30-1, therefore, the HC values from test D30-2 should be the ones of record.

An examination of the continuous vs bagged NO_x values following the basic transient test series showed the continuous values to be slightly lower than the bagged. From previous experience, this occurrence is considered highly improbable. A check revealed that one of the two necessary pumps was not operating in the sampling system. An additional test was run consisting of a cold start and two hot starts in order to provide some usable NO_x data. The HC sample line problem recurred during the cold start, but the hot start HC values were used in the data base.

EMA/EPA COOPERATIVE TEST PROGRAM

EMISSION SUMMARY

ENGINE DDA 8V71TA TEST SITE SwRI TEST PERIOD July

	TRANSIENT EMISSIONS			STEADY STATE EMISSIONS		
NOx	COLD	HOT	COMPOSITE	13-MODE	MODE-6	MODE-11
MEAN ($\bar{x}$) GM/BHP HR.	7.27	8.02	7.91	8.98	—	—
STD. DEV. (s)	—	0.04	—	0.01	—	—
S/$\bar{X}$ x 100%	—	0.44	—	0.03	—	—
SAMPLE SIZE	1	2	—	2	—	—
HC						
MEAN ($\bar{x}$) GM/BHP HR.	0.81	0.72	0.73	0.68	—	—
STD. DEV. (s)	—	0.03	—	0.02	—	—
S/$\bar{X}$ x 100%	—	4.81	—	3.14	—	—
SAMPLE SIZE	1	8	—	2	—	—
PARTICULATE						
MEAN ($\bar{x}$) GM/BHP HR.	0.44	0.44	0.44	0.42	—	—
STD. DEV (s)	0.04	0.02	—	0.001	—	—
S/$\bar{X}$ x 100%	8.67	3.50	—	0.34	—	—
SAMPLE SIZE	3	14	—	2	—	—

[redacted]	TRANSIENT SMOKE		
	ACCEL	LUG	PEAK
MEAN ($\bar{x}$) % OPACITY	—	—	—
STD. DEV. (s)	—	—	—
S/$\bar{X}$ x 100%	—	—	—
SAMPLE SIZE	—	—	—

COMMENTS:

EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: DDA 8V 71TA

TEST DATE: July 28, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-1							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	–	–	–	–	–	–	–
HC GM/BHP-HR	–	–	–	–	–	–	–
CO GM/BHP-HR	1.86	2.23	2.32	2.34	2.33	2.37	2.30
CO_2 GM/BHP-HR	667	638	647	641	638	647	629
PARTICULATES GM/BHP-HR	0.41	0.40	0.44	0.44	0.44	0.44	0.44

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
NO_x							
BACKGROUND CONC. (PPM)	–	–	–	–	–	–	–
BAG CONC. (PPM)	–	–	–	–	–	–	–
BAG CONC-CORRECTED (PPM)	–	–	–	–	–	–	–
BAG MASS-CORRECTED (GMS)	–	–	–	–	–	–	–
CO							
BACKGROUND CONC. (PPM)	1	0	1	1	1	1	0
BAG CONC. (PPM)	31	37	38	38	38	38	37
BAG CONC-CORRECTED (PPM)	30	37	37	37	37	37	37
BAG MASS-CORRECTED (GMS)	40	49	50	51	51	51	50
CO_2							
BACKGROUND CONC. (PPM)	0.04	0.04	0.04	0.04	0.04	0.04	0.05
BAG CONC. (PPM)	0.68	0.67	0.67	0.66	0.67	0.67	0.66
BAG CONC-CORRECTED (PPM)	0.64	0.63	0.63	0.62	0.63	0.63	0.61
BAG MASS-CORRECTED (GMS)	14345	[illegible]	14069	13710	13339	13719	[illegible]
HC							
BACKGROUND CONC. (PPM)	6	7	7	6	6	7	6

TE 1-2
8-17-81

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-1							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	–	–	–	–	–	–	–
CORR. CONC. (PPM)	–	–	–	–	–	–	–
CORR. MASS (GMS)	–	–	–	–	–	–	–
NO_x							
CONC. (PPM)	–	–	–	–	–	–	–
CORR. CONC. (PPM)	–	–	–	–	–	–	–
CORR. MASS (GMS)	–	–	–	–	–	–	–
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	42601	42648	42612	42624	42631	[illegible]	[illegible]
LBS	–	–	–	–	–	–	–
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	72	76	76	73	76	77	77
HUMIDITY (GRAINS)	91	95	95	84	84	73	83
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	507	522	[illegible]	524	524	[illegible]	526
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: DDA 8V71TA

TEST DATE: July 21 [illegible]

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-1							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	265.108	270.058	264.906	266.819	284.911	263.450	273.687
TARE WT. (MG)	258.450	262.782	257.775	259.614	277.670	256.340	266.492
PARTICULATE MASS (MG)	6.658	7.276	7.131	7.205	7.241	7.110	7.195
SECONDARY FILTER							
LOADED WT. (MG)	257.996	258.385	251.809	275.907	264.018	267.957	262.272
TARE WT. (MG)	257.209	258.084	251.487	275.630	263.650	267.655	261.957
PARTICULATE MASS (MG)	0.787	0.301	0.322	0.277	0.368	0.302	0.315
TOT. PART. MASS (MG)	7.445	7.577	7.453	7.482	7.609	7.412	7.510
PRIMARY FILTER EFF. (%)	89	96	96	96	95	96	96
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	76	83	86	88	89	90	91
HUMIDITY (GRAINS)	91	95	95	34	34	33	33
INLET FLOW (SCF)	1.93	1.91	1.90	1.90	1.90	[illegible]	[illegible]
PEAK SAMPLE ZONE TEMP. (°F)	221	213	221	224	224	225	225
FLOW THROUGH FILTER (SCF)	3.71	3.76	3.58	3.53	3.61	3.70	[illegible]
PEAK FILTER TEMP (°F)	96	100	102	104	104	106	107
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOLUBLE ORGANIC FRACTION (%)	—	—	—	—	—	—	—
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: DDA 8V71TA

TEST DATE: July [illegible]

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-1							
BARO PRESS. (IN-HG)	29.31	29.32	29.30	29.31	29.31	29.32	29.32
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	73	82	85	87	84	83	82
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	72	75	76	76	75	73	[illegible]
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	—	—	—	—	—	—	—
CALCULATED (LBS)	10.05	9.63	9.76	9.65	9.57	9.71	9.48
CARBON BALANCE ERROR (%)	—	—	—	—	—	—	—
CYCLE WORK (BHP-HR)	21.51	21.91	21.76	21.71	21.69	21.64	21.76
CYCLE BSFC (LB/BHP-HR)	0.467	0.442	0.448	0.445	0.442	0.449	0.436
CYCLE START OIL SUMP TEMP (°F)	73	136	135	134	135	135	133
CYCLE START TIME (HH-MM-SS)	9:00	9:40	—	11:04	11:44	12:24	1:03
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		—	—	—	—	—	—
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: DDA 8V71TA

TEST DATE: July 28 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D32-1	—	—	—	—	—	—	—	
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176	
SLOPE	.945	.997	.998	.990	.990	.992	.992	.97-1.03
Y-INTERCEPT	98	43	40	47	46	40	40	±50 RPM
STD. ERROR	152	78	72	69	72	61	61	100 RPM
COEFF. OF DET.	.9474	.9861	.9880	.9890	.9877	.9913	.9913	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	910	951	963	972	972	961	961	
SLOPE	.960	.960	.943	.944	.945	.944	.944	.77/.83-1.03
Y-INTERCEPT	-7.9	-11.4	-3.0	-6.0	-6.9	-2.7	-2.7	±15 FT-LBS
STD. ERROR	7.%	6.%	6.%	7.%	7.%	6.%	6.%	13%
COEFF. OF DET.	.9400	.9524	.9515	.9488	.9458	.9506	.9506	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	910	951	963	972	972	961	961	
SLOPE	1.004	1.004	.994	.990	.987	.986	.986	.87/.89-1.03
Y-INTERCEPT	-1.3	-2.5	-.3	-1.3	-1.4	-.0	-.0	±5 BHP
STD. ERROR	6.%	6.%	6.%	6.%	6.%	6.%	6.%	8%
COEFF. OF DET.	.9561	.9643	.9510	.9603	.9606	.9586	.9586	.91 MIN.

TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	21.51	21.91	21.76	21.71	21.69	21.64	21.76	-15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	23.23	23.23	23.23	23.23	23.23	23.23	23.23	
ACTUAL/REF. RATIO.	-7.4	-5.7	-6.3	-6.5	-6.6	-6.8	-6.3	
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: DDA 3V71TA TEST DATE: July 29, 1981

TEST SITE: SwRI

COMMENTS: ______

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-2	—	—	—	—	—	—	—
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	—	—	—	—	—	—	—
HC GM/BHP-HR	(0.81)	(0.70)	(0.66)	(0.71)	(0.72)	(0.69)	(0.73)
CO GM/BHP-HR	1.93	2.35	2.30	2.36	2.39	2.37	2.32
CO_2 GM/BHP-HR	675	646	651	637	640	652	639
PARTICULATES GM/BHP-HR	0.48	0.46	0.44	0.44	0.45	0.44	0.43

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
NO_x							
BACKGROUND CONC. (PPM)	—	—	—	—	—	—	—
BAG CONC. (PPM)	—	—	—	—	—	—	—
BAG CONC-CORRECTED (PPM)	—	—	—	—	—	—	—
BAG MASS-CORRECTED (GMS)	—	—	—	—	—	—	—
CO							
BACKGROUND CONC. (PPM)	0	1	1	1	0	1	1
BAG CONC. (PPM)	31	38	38	39	39	39	39
BAG CONC-CORRECTED (PPM)	31	37	37	38	39	38	38
BAG MASS-CORRECTED (GMS)	41	51	50	51	52	51	51
CO_2							
BACKGROUND CONC. (PPM)	0.05	0.04	0.04	0.04	0.05	0.04	0.04
BAG CONC. (PPM)	0.69	0.67	0.67	0.66	0.67	0.68	0.66
BAG CONC-CORRECTED (PPM)	0.64	0.63	0.63	0.62	0.62	0.64	0.62
BAG MASS-CORRECTED (GMS)	14362	13949	14055	13777	13854	14162	13801
HC							
BACKGROUND CONC. (PPM)	8	8	9	7	7	8	6

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8-17-81

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-2							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	33	29	29	29	29	29	28
CORR. CONC. (PPM)	25	21	20	22	22	21	22
CORR. MASS (GMS)	17	15	14	15	16	15	16
NO_x							
CONC. (PPM)	–	–	–	–	–	–	–
CORR. CONC. (PPM)	–	–	–	–	–	–	–
CORR. MASS (GMS)	–	–	–	–	–	–	–
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	42606	42574	42626	42566	42562	42541	42474
LBS	–	–	–	–	–	–	–
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	79	79	77	74	76	77	78
HUMIDITY (GRAINS)	70	70	78	73	74	74	76
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	508	525	525	523	526	525	525
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EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: DDA 8V71TA TEST DATE: July 27 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-2							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	273.942	282.767	281.547	269.975	268.177	258.934	264.583
TARE WT. (MG)	266.478	275.135	274.402	262.778	260.715	251.722	257.540
PARTICULATE MASS (MG)	7.464	7.632	7.145	7.197	7.462	7.212	7.043
SECONDARY FILTER							
LOADED WT. (MG)	263.004	269.658	280.352	262.617	257.998	257.782	258.[illegible]18
TARE WT. (MG)	262.120	269.375	280.062	262.323	257.780	257.513	258.304
PARTICULATE MASS (MG)	0.884	0.283	0.290	0.294	0.218	0.269	0.214
TOT. PART. MASS (MG)	8.348	7.915	7.435	7.411	7.680	7.481	7.257
PRIMARY FILTER EFF. (%)	89	96	96	96	97	96	97
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	76	83	87	88	90	90	91
HUMIDITY (GRAINS)	70	70	78	78	74	74	76
INLET FLOW (SCF)	1.93	1.91	1.90	1.89	1.89	1.89	1.8[illegible]
PEAK SAMPLE ZONE TEMP. (°F)	221	223	225	225	227	225	225
FLOW THROUGH FILTER (SCF)	3.69	3.62	3.56	3.57	3.57	3.55	3.55
PEAK FILTER TEMP (°F)	96	98	102	105	106	105	107
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOULBLE ORGANIC FRACTION (%)	42	–	40	–	–	–	–
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: DDA 5V71TA TEST DATE: July 29 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-2							
BARO PRESS. (IN-HG)	29.29	29.29	29.29	29.27	29.27	29.26	29.22
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	90	83	81	83	84	81	83
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	74	76	74	75	76	73	78
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	–	–	–	–	–	–	–
CALCULATED (LBS)	9.96	9.68	9.75	9.56	9.61	9.79	9.8
CARBON BALANCE ERROR (%)	–	–	–	–	–	–	–
CYCLE WORK (BHP-HR)	21.29	21.61	21.59	21.62	21.64	21.62	21.61
CYCLE BSFC (LB/BHP-HR)	0.468	0.448	0.452	0.442	0.445	0.453	0.444
CYCLE START OIL SUMP TEMP (°F)	74	133	137	135	134	131	131
CYCLE START TIME (HH-MM-SS)	9:49	10:30	11:10	–	12:40	1:20	2:00
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		–	–	–	–	–	–
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EPA/EMA COOPERATIVE TEST PROGRAM
TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: DDA 8V71TA

TEST SITE: SwRI

TEST DATE: July 29, 1981

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D30-2								
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176	
SLOPE	.989	.988	.979	.984	.988	.987	.986	.97-1.03
Y-INTERCEPT	47	45	51	47	42	44	47	±50 RPM
STD. ERROR	59	55	49	55	56	58	62	100 RPM
COEFF. OF DET.	.9419	.9428	.9447	.9428	.9427	.9421	.9408	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	928	951	1046	972	972	972	956	
SLOPE	.939	.940	.938	.943	.942	.945	.952	.77/.83-1.03
Y-INTERCEPT	-5.3	-1.8	-3.9	-8.0	-8.8	-6.0	-7.5	±15 FT-LBS
STD. ERROR	8.%	7.%	5.%	7.%	7.%	7.%	7.%	13%
COEFF. OF DET.	.9190	.9477	.9215	.9451	.9401	.9471	.9499	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	928	959	1046	972	972	972	956	
SLOPE	.956	.983	.979	.984	.983	.987	.988	.87/.89-1.03
Y-INTERCEPT	-.8	.3	-.8	-1.9	-2.1	-1.2	-1.1	±5 BHP
STD. ERROR	7.%	6.%	4.%	6.%	6.%	6.%	6.%	8%
COEFF. OF DET.	.9417	.9566	.9493	.9512	.9528	.9518	.9595	.91 MIN.

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TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	21.29	21.61	21.59	21.62	21.64	21.62	21.61	-15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	23.23	23.23	23.23	23.23	23.23	23.23	23.23	
ACTUAL/REF. RATIO.	-8.4	-7.0	-7.1	-6.9	-6.8	-6.9	-7.0	
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EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: DDA 8V71TA TEST DATE: August 4 1981

TEST SITE: SwRI

COMMENTS: ____

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-3							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	(7.27)	(7.49)	(8.04)	—	—	—	—
HC GM/BHP-HR	—	(0.75)	(0.77)	—	—	—	—
CO GM/BHP-HR	1.94	2.39	2.37	—	—	—	—
CO_2 GM/BHP-HR	719.	685.	664.	—	—	—	—
PARTICULATES GM/BHP-HR	0.42	0.44	0.47	—	—	—	—

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
NO_x							
BACKGROUND CONC. (PPM)	1	1	0	—	—	—	—
BAG CONC. (PPM)	56	63	60	—	—	—	—
BAG CONC-CORRECTED (PPM)	55	62	60	—	—	—	—
BAG MASS-CORRECTED (GMS)	131	144	137	—	—	—	—
CO							
BACKGROUND CONC. (PPM)	1	1	1	—	—	—	—
BAG CONC. (PPM)	30	39	39	—	—	—	—
BAG CONC-CORRECTED (PPM)	29	38	38	—	—	—	—
BAG MASS-CORRECTED (GMS)	40	52	52	—	—	—	—
CO_2							
BACKGROUND CONC. (PPM)	0.05	0.04	0.04	—	—	—	—
BAG CONC. (PPM)	0.70	0.71	0.69	—	—	—	—
BAG CONC-CORRECTED (PPM)	0.65	0.67	0.65	—	—	—	—
BAG MASS-CORRECTED (GMS)	14843	14319	14436	—	—	—	—
HC							
BACKGROUND CONC. (PPM)	6	1	7	—	—	—	—

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TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-3							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)		30	31				
CORR. CONC. (PPM)		25	24				
CORR. MASS (GMS)		16	17				
NO_x							
CONC. (PPM)	64	76	76				
CORR. CONC. (PPM)	63	75	76				
CORR. MASS (GMS)	150	174	175				
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	42465	42361	42242				
LBS	–	–	–				
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	74	76	74				
HUMIDITY (GRAINS)	56	88	83				
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	508	525	525				
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: DDA 8V71TA

TEST DATE: August 4, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-3							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	267.803	245.609	280.110				
TARE WT. (MG)	261.370	238.540	272.870				
PARTICULATE MASS (MG)	6.433	7.119	7.240				
SECONDARY FILTER							
LOADED WT. (MG)	257.972	261.120	269.117				
TARE WT. (MG)	257.140	260.750	268.392				
PARTICULATE MASS (MG)	0.832	0.370	0.725				
TOT. PART. MASS (MG)	7.265	7.489	7.965				
PRIMARY FILTER EFF. (%)	89	95	91				
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	84	88	89				
HUMIDITY (GRAINS)	86	88	83				
INLET FLOW (SCF)	1.90	1.89	1.85				
PEAK SAMPLE ZONE TEMP. (°F)	221	223	225				
FLOW THROUGH FILTER (SCF)	3.79	3.62	3.60				
PEAK FILTER TEMP (°F)	94	104	103				
BACKGROUND PART. (MG/HR)	0	0	0				
SOULBLE ORGANIC FRACTION (%)	-	-	-				
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: DDA 8V71TA TEST DATE: August 4 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D30-3							
BARO PRESS. (IN-HG)	29.24	29.24	29.24				
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	83	80	79				
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	74	76	74				
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	–	–	–				
CALCULATED (LBS)	10.23	10.35	10.02				
CARBON BALANCE ERROR (%)	–	–	–				
CYCLE WORK (BHP-HR)	20.64	21.76	21.76				
CYCLE BSFC (LB/BHP-HR)	0.498	0.475	0.461				
CYCLE START OIL SUMP TEMP (°F)	74	134	136				
CYCLE START TIME (HH-MM-SS)	–	10:54	11:40				
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		–	–				
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: DDA SV71TA

TEST SITE: SwRI

TEST DATE: August 4, 1981

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO.	D30.3	—	—	—	—	—	—	
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	—	—	—	—	
SLOPE	.993	.984	.987	—	—	—	—	.97-1.03
Y-INTERCEPT	46	49	46	—	—	—	—	±50 RPM
STD. ERROR	71	69	62	—	—	—	—	100 RPM
COEFF. OF DET.	.9882	.9904	.9921	—	—	—	—	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	944	1053	962	—	—	—	—	
SLOPE	.906	.932	.944	—	—	—	—	.77/.83-1.03
Y-INTERCEPT	-3.1	-3.7	-2.6	—	—	—	—	±15 FT-LBS
STD. ERROR	7%	5.%	7.%	—	—	—	—	13%
COEFF. OF DET.	.9304	.9157	.9486	—	—	—	—	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	944	1053	962	—	—	—	—	
SLOPE	.956	.999	.986	—	—	—	—	.87/.89-1.03
Y-INTERCEPT	.2	-.7	.3	—	—	—	—	±5 BHP
STD. ERROR	7%	5.%	6.%	—	—	—	—	8%
COEFF. OF DET.	.9453	.9360	.9550	—	—	—	—	.91 MIN.

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TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	20.64	21.76	21.76					-15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	23.23	23.23	23.23					
ACTUAL/REF. RATIO.	-11.1	-6.3	-6.3					
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C. INTERNATIONAL HARVESTER DTI-466B

After the fourth hot start of test D31, it was discovered that the HC sample line was not heating. Other equipment malfunctions caused the loss of one hot start (D31-1H1) and one cold start (D31-2C) NO_x value. For these reasons, an additional test was run consisting of a cold start and two hot starts. This provided the necessary two cold starts for HC and NO_x

EMA/EPA COOPERATIVE TEST PROGRAM

EMISSION SUMMARY

ENGINE IH   TEST SITE SwRI   TEST PERIOD August

	TRANSIENT EMISSIONS			STEADY STATE EMISSIONS		
NOx	COLD	HOT	COMPOSITE	13-MODE	MODE-6	MODE-11
MEAN ($\bar{x}$) GM/BHP HR.	4.59	4.38	4.41	3.36	—	—
STD. DEV. (s)	0.11	0.07	—	—	—	—
S/$\bar{X}$ x 100%	2.5	1.5	—	—	—	—
SAMPLE SIZE	2	14	—	1	—	—
HC						
MEAN ($\bar{x}$) GM/BHP HR.	1.18	0.82	0.87	0.77	—	—
STD. DEV. (s)	0.01	0.03	—	—	—	—
S/$\bar{X}$ x 100%	1.2	3.1	—	—	—	—
SAMPLE SIZE	2	11	—	1	—	—
PARTICULATE						
MEAN ($\bar{x}$) GM/BHP HR.	0.63	0.63	0.63	0.52	0.51	0.95
STD. DEV (s)	0.02	0.02	—	0.01	0.01	0.06
S/$\bar{X}$ x 100%	3.3	2.6	—	2.2	2.0	5.8
SAMPLE SIZE	3	15	—	3	3	3

	TRANSIENT SMOKE		
	ACCEL	LUG	PEAK
MEAN ($\bar{x}$) % OPACITY	—	—	—
STD. DEV. (s)	—	—	—
S/$\bar{X}$ x 100%	—	—	—
SAMPLE SIZE	—	—	—

COMMENTS: ______

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EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: I H TEST DATE: Aug. 18 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	7 HOT
TEST NO. D31-1								
CYCLE EMISSIONS*								
NO_x GM/BHP-HR	(4.67)	—	(4.45)	(4.37)	(4.32)	(4.42)	(4.24)	(4.32
HC GM/BHP-HR	—	—	—	—	—	(0.83)	(0.80)	(0.85
CO GM/BHP-HR	2.85	2.42	2.42	2.36	2.42	2.38	2.18	2.30
CO_2 GM/BHP-HR	749.	736.	734.	724.	744.	730.	724.	733.
PARTICULATES GM/BHP-HR	0.62	0.58	0.64	0.63	0.63	0.62	0.63	0.62

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	7 HOT
NO_x								
BACKGROUND CONC. (PPM)	0	0	0	0	0	0	0	0
BAG CONC. (PPM)	37	37	37	36	37	36	36	37
BAG CONC-CORRECTED (PPM)	37	37	37	36	37	36	36	37
BAG MASS-CORRECTED (GMS)	46	46	45	44	46	45	44	45
CO								
BACKGROUND CONC. (PPM)	1	2	2	1	1	1	0	1
BAG CONC. (PPM)	49	43	43	40	42	41	37	40
BAG CONC-CORRECTED (PPM)	48	41	41	39	41	40	37	51
BAG MASS-CORRECTED (GMS)	35	29	29	28	30	29	27	28
CO_2								
BACKGROUND CONC. (PPM)	0.05	0.04	0.04	0.05	0.04	0.04	0.04	0.04
BAG CONC. (PPM)	0.81	0.79	0.79	0.79	0.81	0.79	0.78	0.7[illegible]
BAG CONC-CORRECTED (PPM)	0.76	0.75	0.75	0.74	0.77	0.75	0.74	0.7[illegible]
BAG MASS-CORRECTED (GMS)	9101	8930	8922	8815	9041	8874	8813	88[illegible]
HC								
BACKGROUND CONC. (PPM)	7	7	6	8	10	5	7	6

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	7 HOT
TEST NO. D31-1	___	___	___	___	___	___	___	
INTEGRATED EMISSIONS								
HC								
CONC. (PPM)	39	27	28	28	28	34	32	34
CORR. CONC. (PPM)	32	20	22	20	18	26	25	28
CORR. MASS (GMS)	12	8	8	8	7	10	10	10
NO_x								
CONC. (PPM)	46	–	44	44	43	44	43	43
CORR. CONC. (PPM)	46	–	44	44	43	44	43	43
CORR. MASS (GMS)	57	–	54	53	53	54	52	53
CO								
CONC. (PPM)	___	___	___	___	___	___	___	
CORR. CONC. (PPM)	___	___	___	___	___	___	___	
CORR. MASS (GMS)	___	___	___	___	___	___	___	
CO_2								
CONC (PPM)	___	___	___	___	___	___	___	
CORR. CONC (PPM)	___	___	___	___	___	___	___	
CORR. MASS (GMS)	___	___	___	___	___	___	___	
DILUTION FACTOR	___	___	___	___	___	___	___	
CVS SYSTEM								
TOTAL FLOW SCF	22730	22733	22722	22693	22655	22688	[illegible]	[illegible]
LBS	–	–	–	–	–	–	–	–
PRIMARY DIL. AIR								
AVG. INLET TEMP. (F)	78	78	77	77	78	77	71	7[illegible]
HUMIDITY (GRAINS)	86	86	86	86	86	85	86	85
PEAK EXHAUST TEMP								
AT TUNNEL INLET (F)	683	693	693	693	693	693	697	683
....	___	___	___	___	___	___	___	
....	___	___	___	___	___	___	___	
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: IH   TEST DATE: August 13 198[illegible]

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-1							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	277.542	276.052	276.412	278.338	[illegible]	281.332	253.263
TARE WT. (MG)	269.480	267.356	268.070	269.987	269.345	273.032	[illegible]
PARTICULATE MASS (MG)	8.062	8.696	8.342	8.351	8.320	8.300	8.276
SECONDARY FILTER							
LOADED WT. (MG)	261.106	271.922	264.434	236.371	261.027	263.423	253.697
TARE WT. (MG)	260.500	271.496	264.120	236.150	260.872	263.205	253.435
PARTICULATE MASS (MG)	0.606	0.426	0.314	0.221	0.155	0.218	0.262
TOT. PART. MASS (MG)	8.668	9.122	8.656	8.572	8.475	8.518	8.538
PRIMARY FILTER EFF. (%)	93	95	96	97	98	97	97
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	85	87	92	94	95	94	92
HUMIDITY (GRAINS)	86	86	86	86	86	85	86
INLET FLOW (SCF)	1.73	1.61	1.84	1.84	1.84	1.84	1.85
PEAK SAMPLE ZONE TEMP. (°F)	244	250	251	255	256	253	258
FLOW THROUGH FILTER (SCF)	3.05	3.08	3.11	3.11	3.09	3.10	3.13
PEAK FILTER TEMP (°F)	100	103	105	108	108	107	107
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOULBLE ORGANIC FRACTION (%)	—	—	—	—	—	—	—
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8-17-81

EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: IH

TEST DATE: August 19 19[illegible]

TEST SIDE: SwRI

COMMENTS:

CYCLE TYPE	7. HOT ~~COLD~~	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-1							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	262.633						
TARE WT. (MG)	254.470						
PARTICULATE MASS (MG)	8.163						
SECONDARY FILTER							
LOADED WT. (MG)	270.774						
TARE WT. (MG)	270.478						
PARTICULATE MASS (MG)	0.296						
TOT. PART. MASS (MG)	8.459						
PRIMARY FILTER EFF. (%)	97						
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	92						
HUMIDITY (GRAINS)	85						
INLET FLOW (SCF)							
PEAK SAMPLE ZONE TEMP. (°F)	253						
FLOW THROUGH FILTER (SCF)							
PEAK FILTER TEMP (°F)	107						
BACKGROUND PART. (MG/HR)	0						
SOULBLE ORGANIC FRACTION (%)							
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: IH　　　　TEST DATE: August 18, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-1							
BARO PRESS. (IN-HG)	29.10	29.10	29.08	29.07	29.06	29.06	29.06
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	87	85	89	90	91	105	94
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	75	75	79	80	77	79	72
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	—	—	—	—	—	—	—
CALCULATED (LBS)	6.31	6.20	6.18	6.13	6.30	6.16	6.12
CARBON BALANCE ERROR (%)	—	—	—	—	—	—	—
CYCLE WORK (BHP-HR)	12.16	12.14	12.16	12.22	12.22	12.16	12.17
CYCLE BSFC (LB/BHP-HR)	0.520	0.510	0.509	0.502	0.515	0.507	0.502
CYCLE START OIL SUMP TEMP (°F)	79	147	156	157	170	152	157
CYCLE START TIME (HH-MM-SS)	10:30	11:12	11:52	12:32	1:12	1:55	[illegible]
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		—	—	—	—	—	—
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: IH

TEST SITE: SwRI

TEST DATE: August 18, 1981

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT	7 Ho
TEST NO. D31-1	—	—	—	—	—	—	—		
SPEED REGRESSION									
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176		1176
SLOPE	.993	.995	.993	.996	.998	.995	.989	.97-1.03	.992
Y-INTERCEPT	26.	23	26	25	22.	25.	33	±50 RPM	26.
STD. ERROR	55	56	54	58	54	58	58	100 RPM	57
COEFF. OF DET.	.9948	.9947	.9950	.9944	.9950	.9943	.9942	.97 MIN.	.9945
TORQUE REGRESSION									
NO. OF DATA INCLUDED	971	964	966	974	977	952	976		976
SLOPE	.931	.957	.943	.948	.944	.945	.955	.77/.83-1.03	.954
Y-INTERCEPT	6.0	2.5	4.7	1.8	3.7	1.3	1.1	±15 FT-LBS	1.2
STD. ERROR	6.%	5.%	5.%	6.%	5.%	6.%	6.%	13%	6.%
COEFF. OF DET.	.9601	.9637	.9708	.9590	.9649	.9514	.9589	.85/.88 MIN.	.9515
POWER REGRESSION									
NO. OF DATA INCLUDED	971	964	966	974	977	982	976		976
SLOPE	.994	.995	.985	.995	.996	.991	.994	.87/.89-1.03	.993
Y-INTERCEPT	0	-.7	.2	-1.0	-.4	-1.1	-1.1	±5 BHP	-1.1
STD. ERROR	5.%	5.%	5.%	5.%	5.%	6.%	5.%	8%	5.%
COEFF. OF DET.	.9706	.9773	.9766	.9775	.9748	.9631	.9687	.91 MIN.	.9616

TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	12.16	12.14	12.16	12.22	12.22	12.16	12.17	12.17 -15%, +5% OF REF.
REFERENCE WORK (BHP-HR)	13.14	13.14	13.14	13.14	13.14	13.14	13.14	13.14
ACTUAL/REF. RATIO.	-7.5	-7.6	-7.5	-7.0	-7.0	-7.5	-7.4	-7.4
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EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: IH

TEST DATE: Aug. 11, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-2							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	—	(4.27)	(4.32)	(4.44)	(4.43)	(4.33)	(4.34)
HC GM/BHP-HR	(1.17)	(0.80)	(0.82)	(0.87)	(0.83)	(0.83)	(0.81)
CO GM/BHP-HR	2.66	2.21	2.18	2.25	2.19	2.25	2.24
CO_2 GM/BHP-HR	728	720	713	725	723	728	725
PARTICULATES GM/BHP-HR	0.61	0.61	0.63	0.65	0.63	0.62	0.63

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

NO_x	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	1	0	0	0	0	0	1
BAG CONC. (PPM)	38	37	35	36	36	37	37
BAG CONC-CORRECTED (PPM)	37	37	35	36	36	37	36
BAG MASS-CORRECTED (GMS)	47	45	43	44	45	45	45

CO	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	1	2	1	1	1	1	3
BAG CONC. (PPM)	48	39	38	39	38	39	40
BAG CONC-CORRECTED (PPM)	47	37	37	38	37	38	37
BAG MASS-CORRECTED (GMS)	34	27	27	28	27	28	27

CO_2	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	0.05	0.04	0.04	0.04	0.04	0.04	0.04
BAG CONC. (PPM)	0.83	0.79	0.78	0.79	0.79	0.79	0.79
BAG CONC-CORRECTED (PPM)	0.78	0.75	0.74	0.75	0.75	0.75	0.75
BAG MASS-CORRECTED (GMS)	8355	8898	8752	8906	8845	8946	8836

HC	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	8	3	5	6	7	3	7

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-2							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	48	34	35	35	34	35	35
CORR. CONC. (PPM)	40	26	27	29	27	27	26
CORR. MASS (GMS)	15	10	10	11	10	10	10
NO_x							
CONC. (PPM)	39	43	43	44	44	44	43
CORR. CONC. (PPM)	38	43	43	44	44	44	42
CORR. MASS (GMS)	47	53	53	55	54	54	53
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	22773	22731	22731	22743	22737	22763	22750
LBS	—	—	—	—	—	—	—
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	72	72	74	74	73	77	76
HUMIDITY (GRAINS)	81	81	78	78	70	74	80
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	630	655	688	685	685	6[illegible]3	685
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EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: IH

TEST DATE: Aug. 19 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-2							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	275.430	280.613	245.798	269.564	270.335	281.313	277.850
TARE WT. (MG)	266.395	271.615	236.445	260.617	261.339	273.000	268.920
PARTICULATE MASS (MG)	9.035	8.998	8.353	8.947	8.996	8.313	8.930
SECONDARY FILTER							
LOADED WT. (MG)	263.780	268.809	269.510	264.085	267.750	272.900	271.300
TARE WT. (MG)	263.355	268.621	269.205	263.628	267.530	272.610	271.057
PARTICULATE MASS (MG)	0.425	0.188	0.305	0.457	0.220	0.220	0.243
TOT. PART. MASS (MG)	9.460	9.186	9.158	9.404	9.216	9.033	9.173
PRIMARY FILTER EFF. (%)	96	98	97	98	98	98	97
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	76	84	87	89	90	92	91
HUMIDITY (GRAINS)	81	81	78	73	70	74	80
INLET FLOW (SCF)	1.81	1.78	1.77	1.77	1.77	1.56	1.77
PEAK SAMPLE ZONE TEMP. (°F)	250	252	253	251	252	252	254
FLOW THROUGH FILTER (SCF)	3.18	3.18	3.13	3.10	3.13	3.11	3.11
PEAK FILTER TEMP (°F)	95	102	104	104	106	106	103
BACKGROUND PART. (MG/HR)	0	0	0	0	0	0	0
SOULBLE ORGANIC FRACTION (%)	42	—	—	—	—	25	—
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: IH

TEST DATE: Aug. 14 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-2							
BARO PRESS. (IN-HG)	29.16	29.17	29.17	29.13	29.12	29.12	29.11
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	91	86	93	90	92	94	89
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	73	78	74	79	80	76	80
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	–	–	–	–	–	–	–
CALCULATED (LBS)	6.51	6.18	6.07	6.18	6.13	6.20	6.16
CARBON BALANCE ERROR (%)	–	–	–	–	–	–	–
CYCLE WORK (BHP-HR)	12.84	12.36	12.27	12.29	12.24	12.29	12.26
CYCLE BSFC (LB/BHP-HR)	0.506	0.499	[illegible]	0.503	0.501	0.505	0.503
CYCLE START OIL SUMP TEMP (°F)	73	147	158	157	156	157	162
CYCLE START TIME (HH-MM-SS)	–	–	12:04	12:43	1:30	–	2:50
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		–	–	–	–	–	–
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: IH

TEST DATE: Aug. 19, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D31-2	—	—	—	—	—	—	—	
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	1176	1176	1176	1176	
SLOPE	.998	.996	1.000	.997	.995	.993	.992	
Y-INTERCEPT	27	29.	22.	25.	24.	27	28.	.97-1.03
STD. ERROR	55	56	51	50	49	56	55	±50 RPM
COEFF. OF DET.	.9949	.9948	.9957	.9959	.9951	.9948	.9949	100 RPM
TORQUE REGRESSION								.97 MIN.
NO. OF DATA INCLUDED	971	978	969	910	975	973	954	
SLOPE	.987	.911	.975	.968	.971	.971	.977	
Y-INTERCEPT	1.2	-2.3	-1.1	-1.3	-.2	-4.3	-3.4	.77/.83-1.03
STD. ERROR	6.%	5.%	6.%	6.%	6.%	7.%	7.%	±15 FT-LBS
COEFF. OF DET.	.9560	.9677	.9631	.9527	.9615	.9527	.9502	13%
POWER REGRESSION								.85/.88 MIN.
NO. OF DATA INCLUDED	971	978	969	910	975	973	954	
SLOPE	1.035	1.020	1.007	1.004	1.003	1.014	1.007	
Y-INTERCEPT	-.5	-1.1	-.6	-.8	-.5	-1.6	-1.3	.87/.89-1.03
STD. ERROR	6.%	5.%	5.%	6.%	6.%	6.%	6.%	±5 BHP
COEFF. OF DET.	.9675	.9740	.9703	.9649	.9655	.9618	.9602	8%
								.91 MIN.

TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	12.84	12.36	12.27	12.29	12.24	12.29	12.26	
REFERENCE WORK (BHP-HR)	13.14	13.14	13.14	13.14	13.14	13.14	13.14	-15%, +5% OF REF.
ACTUAL/REF. RATIO.	-2.3	-5.9	-6.6	-6.5	-6.9	-6.5	-6.7	
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EMA/EPA COOPERATIVE TEST PROGRAM

TRANSIENT EMISSIONS DATA SHEET

ENGINE: IH

TEST DATE: Aug. 20, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-3							
CYCLE EMISSIONS*							
NO_x GM/BHP-HR	(4.51)	(4.41)	(4.47)				
HC GM/BHP-HR	(1.19)	(0.31)	(0.73)				
CO GM/BHP-HR	2.77	2.14	2.21				
CO_2 GM/BHP-HR	734	709	728				
PARTICULATES GM/BHP-HR	0.65	0.64	0.61				

*PUT INTEGRATED VALUES IN PARENTHESES.

BAG EMISSIONS

NO_x	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	1	0	0				
BAG CONC. (PPM)	37	37	38				
BAG CONC-CORRECTED (PPM)	36	37	38				
BAG MASS-CORRECTED (GMS)	46	45	46				

CO	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	1	1	1				
BAG CONC. (PPM)	49	38	31				
BAG CONC-CORRECTED (PPM)	48	37	30				
BAG MASS-CORRECTED (GMS)	34	26	27				

CO_2	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	0.05	0.04	0.05				
BAG CONC. (PPM)	0.81	0.78	0.80				
BAG CONC-CORRECTED (PPM)	0.76	0.74	0.75				
BAG MASS-CORRECTED (GMS)	9115	8741	8974				

HC	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
BACKGROUND CONC. (PPM)	7	7	7				

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8-17-81

TRANSIENT EMISSIONS DATA SHEET (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. 231-3							
INTEGRATED EMISSIONS							
HC							
CONC. (PPM)	46	33	33				
CORR. CONC. (PPM)	39	26	26				
CORR. MASS (GMS)	15	10	10				
NO_x							
CONC. (PPM)	46	44	45				
CORR. CONC. (PPM)	45	44	45				
CORR. MASS (GMS)	56	54	56				
CO							
CONC. (PPM)							
CORR. CONC. (PPM)							
CORR. MASS (GMS)							
CO_2							
CONC (PPM)							
CORR. CONC (PPM)							
CORR. MASS (GMS)							
DILUTION FACTOR							
CVS SYSTEM							
TOTAL FLOW SCF	22736	22305	22762				
LBS	—	—	—				
PRIMARY DIL. AIR							
AVG. INLET TEMP. (F)	72	72	73				
HUMIDITY (GRAINS)	81	81	80				
PEAK EXHAUST TEMP							
AT TUNNEL INLET (F)	667	679	680				
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EMA/EPA COOPERATIVE TEST PROGRAM

PARTICULATE EMISSIONS DATA SHEET

ENGINE: IH

TEST DATE: Aug. 20 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-3							
PARTICULATE FILTERS							
PRIMARY (OR PRI+SEC)							
LOADED WT. (MG)	231.000	269.355	280.925				
TARE WT. (MG)	212.270	260.181	272.044				
PARTICULATE MASS (MG)	8.730	9.174	8.881				
SECONDARY FILTER							
LOADED WT. (MG)	273.325	261.016	263.038				
TARE WT. (MG)	273.320	260.648	262.980				
PARTICULATE MASS (MG)	0.505	0.368	0.058				
TOT. PART. MASS (MG)	9.235	9.542	8.939				
PRIMARY FILTER EFF. (%)	95	96	99				
PART. SYSTEM FLOW							
SECONDARY DIL. AIR							
INLET TEMP. (°F)	79	86	88				
HUMIDITY (GRAINS)	81	81	80				
INLET FLOW (SCF)	1.79	1.73	1.77				
PEAK SAMPLE ZONE TEMP. (°F)	244	248	243				
FLOW THROUGH FILTER (SCF)	3.12	3.16	3.13				
PEAK FILTER TEMP (°F)	97	101	102				
BACKGROUND PART. (MG/HR)	0	0	0				
SOULBLE ORGANIC FRACTION (%)	—	—	—				
....							
....							
....							
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EMA/EPA COOPERATIVE TEST PROGRAM
GENERAL DATA SUMMARY

ENGINE: IH

TEST DATE: Aug. 20, 1981

TEST SITE: SwRI

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT
TEST NO. D31-3							
BARO PRESS. (IN-HG)	29.18	29.19	29.15				
ENGINE INLET AIR							
SPEC. HUMIDITY (GRAINS)							
AVG	92	83	81				
MAX							
MIN							
INLET AIR TEMP (°F)							
AVG	74	77	78				
MAX							
MIN							
FUEL CONSUMPTION							
MEASURED (LBS)	—	—	—				
CALCULATED (LBS)	6.34	6.07	6.23				
CARBON BALANCE ERROR (%)	—	—	—				
CYCLE WORK (BHP-HR)	12.34	12.34	12.36				
CYCLE BSFC (LB/BHP-HR)	0.514	0.492	0.505				
CYCLE START OIL SUMP TEMP (°F)	74	150	152				
CYCLE START TIME (HH-MM-SS)	—	10:20	—				
BETWEEN CYCLE ANALYSIS TIME (MM-SS)		—	—				
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EPA/EMA COOPERATIVE TEST PROGRAM

TRANSIENT CYCLE STATISTICS SUMMARY

ENGINE: IH

TEST SITE: SwRI

TEST DATE: Aug. 20, 1981

COMMENTS:

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS COLD/HOT
TEST NO. D31-3	—	—	—	—	—	—	—	
SPEED REGRESSION								
NO. OF DATA INCLUDED	1176	1176	1176	—	—	—	—	
SLOPE	.999	.998	1.001	—	—	—	—	.97-1.03
Y-INTERCEPT	23	23	21	—	—	—	—	±50 RPM
STD. ERROR	51	49	51	—	—	—	—	100 RPM
COEFF. OF DET.	.9959	.9959	.9957	—	—	—	—	.97 MIN.
TORQUE REGRESSION								
NO. OF DATA INCLUDED	960	960	978	—	—	—	—	
SLOPE	.983	.991	.991	—	—	—	—	.77/.83-1.03
Y-INTERCEPT	1.4	-.4	-1.7	—	—	—	—	±15 FT-LBS
STD. ERROR	5.%	5.%	5.%	—	—	—	—	13%
COEFF. OF DET.	.9718	.9722	.9708	—	—	—	—	.85/.88 MIN.
POWER REGRESSION								
NO. OF DATA INCLUDED	960	960	978	—	—	—	—	
SLOPE	1.019	1.018	1.021	—	—	—	—	.87/.89-1.03
Y-INTERCEPT	-.1	-.5	-.9	—	—	—	—	±5 BHP
STD. ERROR	5.%	5.%	5.%	—	—	—	—	8%
COEFF. OF DET.	.9777	.9785	.9763	—	—	—	—	.91 MIN.

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TRANSIENT CYCLE STATISTICS SUMMARY (CON'T)

CYCLE TYPE	COLD	1 HOT	2 HOT	3 HOT	4 HOT	5 HOT	6 HOT	LIMITS
ACTUAL WORK (BHP-HR)	12.34	12.34	12.36					
REFERENCE WORK (BHP-HR)	13.14	13.14	13.14					-15%, +5% OF REF.
ACTUAL/REF. RATIO.	-6.1	-6.1	-5.9					
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....								
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LIST OF REFERENCES

1. Federal Register, "Control on Air Pollution from New Motor Vehicles and New Motor Vehicle Engines; Particulate Regulation for Heavy-Duty Diesel Engines." Part III, Vol. 46, No. 4, January 7, 1981.

2. Federal Register, "1983 and Later Model Year HD Engines," Part II, Proposed Gaseous Emission Regulations, Vol. 44, No. 31, February 13, 1979.

3. Federal Register, "Gaseous Emission Regulations for 1984 and Later Model Year Heavy-Duty Engines," Part II, Vol. 45, No. 14, January 21, 1980.

APPENDIX

Computer Printouts of Test Data

1. Cummins VTB-903
2. DDA 8V-71TA
3. IHC DTI-466B

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TABLE A-1. 13-MODE FEDERAL DIESEL EMISSION CYCLE 1979

ENGINE:CUMMINS VTB-903 BAROMETER 29.11
TEST NO. D29-3 FUEL: EM-477-F PROJECT:05-6598-001 DATE: 07/

MODE	POWER PCT	ENGINE SPEED COND / RPM	TORQUE OBS LB-FT	POWER OBS BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	INTAKE HUMID GR/LB	NOX CORR FACT	MEASURED HC PPM	MEASURED CO PPM	MEASURED CO2 PCT	MEASURED NOX PPM	CALCULATED GRAMS / HOUR HC	CALCULATED GRAMS / HOUR CO	CALCULATED GRAMS / HOUR NOX	MODE
1		IDLE / 692.	0.	.0	.063	11.48	95.	1.114	584.	244.	.97	45.	96.	81.	27.	1
2	2	INTER / 1500.	14.	4.0	.176	26.26	89.	1.088	1024.	292.	1.49	47.	307.	175.	50.	2
3	25	INTER / 1500.	183.	52.3	.393	27.18	85.	1.066	200.	159.	3.24	135.	67.	106.	156.	3
4	50	INTER / 1500.	365.	104.2	.651	28.10	89.	1.060	120.	159.	5.34	350.	42.	107.	407.	4
5	75	INTER / 1500.	548.	156.5	.943	29.93	85.	1.039	84.	239.	7.40	640.	31.	168.	763.	5
6	100	INTER / 1500.	730.	208.5	1.253	30.85	89.	1.033	54.	841.	9.30	1200.	21.	621.	1494.	6
7		IDLE / 694.	0.	.0	.064	10.95	93.	1.100	504.	260.	.97	48.	84.	87.	29.	7
8	100	RATED / 2100.	678.	271.1	1.666	48.00	98.	1.064	56.	159.	7.71	1095.	35.	190.	2270.	8
9	75	RATED / 2100.	508.	203.1	1.272	45.33	89.	1.053	64.	127.	6.18	630.	38.	144.	1230.	9
10	50	RATED / 2100.	339.	135.5	.962	42.48	93.	1.070	88.	122.	4.89	340.	49.	132.	645.	10
11	25	RATED / 2100.	169.	67.6	.694	40.70	89.	1.071	140.	159.	3.48	160.	78.	174.	306.	11
12	2	RATED / 2100.	12.	4.8	.355	37.97	93.	1.094	464.	252.	2.02	70.	219.	237.	117.	12
13		IDLE / 694.	0.	.0	.063	11.28	89.	1.090	512.	279.	.97	50.	85.	93.	30.	13

MODE	CALCULATED GRAMS/LB-FUEL HC	GRAMS/LB-FUEL CO	GRAMS/LB-FUEL NOX	GRAMS/BHP-HR HC	GRAMS/BHP-HR CO	GRAMS/BHP-HR NOX	F/A DRY MEAS	F/A STOICH	'PHI'	WET HC CORR FACT	F/A CALC	F/A PCT MEAS	POWER CORR FACT	BSFC CORR LB/HP-HR	MODAL WEIGHT FACTOR	MODE
1	25.43	21.39	7.17	******	******	******	.0056	.0695	.080	.989	.0050	-10.4	.994	*****	.067	1
2	29.09	16.61	4.75	76.82	43.87	12.53	.0068	.0695	.098	.984	.0077	13.0	1.009	2.617	.080	2
3	2.86	4.48	6.62	1.29	2.02	2.98	.0146	.0695	.210	.970	.0153	5.0	1.010	.446	.080	3
4	1.06	2.73	10.42	.40	1.03	3.90	.0235	.0695	.338	.953	.0249	6.2	1.011	.371	.080	4
5	.55	2.77	13.48	.20	1.07	4.87	.0319	.0695	.459	.937	.0342	7.3	1.015	.356	.080	5
6	.28	8.27	19.89	.10	2.98	7.17	.0411	.0695	.592	.922	.0429	4.3	1.017	.354	.080	6
7	22.08	22.93	7.60	******	******	******	.0059	.0695	.085	.989	.0050	-15.7	.997	*****	.067	7
8	.35	1.90	22.70	.13	.70	8.37	.0352	.0695	.507	.934	.0355	.9	1.053	.350	.080	8
9	.49	1.89	16.12	.19	.71	6.05	.0284	.0695	.409	.946	.0287	.9	1.048	.359	.080	9
10	.85	2.29	11.16	.36	.98	4.75	.0229	.0695	.330	.956	.0228	-.5	1.041	.409	.080	10
11	1.87	4.18	7.35	1.15	2.58	4.53	.0173	.0695	.249	.968	.0164	-4.9	1.037	.594	.080	11
12	10.27	11.12	5.51	45.61	49.38	24.49	.0095	.0695	.136	.979	.0099	4.0	1.032	4.304	.080	12
13	22.37	24.54	7.82	******	******	******	.0057	.0695	.082	.989	.0050	-12.7	.998	*****	.067	13

CYCLE COMPOSITE USING 13-MODE WEIGHT FACTORS

BSHC -------- = .918 GRAM/BHP-HR
BSCO -------- = 1.883 GRAM/BHP-HR
BSNOX ------- = 6.218 GRAM/BHP-HR
BSHC + BSNOX = 7.137 GRAM/BHP-HR
CORR. BSFC -- = .410 LBS/BHP-HR

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x

C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN1
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-59. PCT
ABSOLUTE HUMIDITY 12.7 GM/KG(88.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6379.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.4 (10541.)	302.5 (10684.)	307.6 (10863.)	299.5 (10579.)
HC SAMPLE METER/RANGE/PPM	36.9/23/ 184.	25.1/23/ 125.	15.4/23/ 77.	10.1/23/ 51.
HC BCKGRD METER/RANGE/PPM	10.5/ 2/ 11.	10.0/ 2/ 10.	10.0/ 2/ 10.	9.9/ 2/ 10.
CO SAMPLE METER/RANGE/PPM	50.9/13/ 48.	43.3/13/ 40.	37.3/13/ 35.	22.7/13/ 21.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	1.0/13/ 1.	1.0/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	21.5/ 3/ .35	28.1/ 3/ .46	60.8/ 3/ 1.08	19.2/ 3/ .31
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.4/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	5.4/13/ 16.	8.4/13/ 25.	26.3/13/ 79.	5.6/13/ 17.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	36.19	28.01	12.29	42.52
HC CONCENTRATION PPM	174.	116.	68.	41.
CO CONCENTRATION PPM	46.	38.	32.	19.
CO2 CONCENTRATION PCT	.31	.42	1.03	.26
NOX CONCENTRATION PPM	15.9	25.1	78.3	16.4
HC MASS GRAMS	29.98	20.18	12.06	7.08
CO MASS GRAMS	16.04	13.56	11.60	6.77
CO2 MASS GRAMS	1670.1	2330.3	5807.2	1452.2
NOX MASS GRAMS	9.05	14.50	46.09	9.39
FUEL KG (LB)	.559 (1.23)	.754 (1.66)	1.830 (4.03)	.463 (1.02)
KW HR (HP HR)	1.38 (1.86)	2.24 (3.01)	7.21 (9.67)	1.32 (1.77)
BSHC G/KW HR (G/HP HR)	21.66 (16.15)	8.99 (6.70)	1.67 (1.25)	5.36 (4.00)
BSCO G/KW HR (G/HP HR)	11.59 (8.64)	6.04 (4.50)	1.61 (1.20)	5.12 (3.82)
BSCO2 G/KW HR (G/HP HR)	1206.56 (899.73)	1038.21 (774.19)	805.70 (600.81)	1098.66 (819.27)
BSNOX G/KW HR (G/HP HR)	6.54 (4.88)	6.46 (4.82)	6.39 (4.77)	7.10 (5.30)
BSFC KG/KW HR (LB/HP HR)	.404 (.664)	.336 (.552)	.254 (.417)	.351 (.576)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.16 (16.30)
BSHC G/KW HR (G/HP HR)	5.70 (4.25)
BSCO G/KW HR (G/HP HR)	3.95 (2.94)
BSCO2 G/KW HR (G/HP HR)	926. (691.)
BSNOX G/KW HR (G/HP HR)	6.50 (4.85)
BSFC KG/KW HR (LB/HP HR)	.297 (.488)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.733 (25.89)
MULTIPLIER FOR	G/TEST	1.648
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1355 (.1011)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4570 (.2073)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D291H RUN1
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.24 MM HG(29.34 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.2 GM/KG(85.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.4 (10538.)	302.4 (10681.)	307.5 (10860.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	8.4/23/ 42.	13.2/23/ 66.	10.5/23/ 52.	8.5/23/ 43.
HC BCKGRD METER/RANGE/PPM	9.0/ 2/ 9.	8.8/ 2/ 9.	8.8/ 2/ 9.	8.8/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	26.8/13/ 25.	29.9/13/ 27.	19.4/13/ 18.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.1/13/ 0.	.2/13/ 0.	.3/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	19.1/ 3/ .31	26.3/ 3/ .43	59.8/ 3/ 1.06	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.1/ 3/ .05	3.0/ 3/ .05	3.7/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	5.8/13/ 18.	9.9/13/ 30.	29.6/13/ 89.	6.4/13/ 19.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	42.86	30.50	12.56	43.13
HC CONCENTRATION PPM	33.	57.	44.	34.
CO CONCENTRATION PPM	20.	24.	26.	17.
CO2 CONCENTRATION PCT	.26	.38	1.02	.25
NOX CONCENTRATION PPM	17.1	29.2	80.3	18.7
HC MASS GRAMS	5.73	10.03	7.86	5.88
CO MASS GRAMS	7.05	8.38	9.39	5.91
CO2 MASS GRAMS	1429.1	2128.8	5724.9	1366.4
NOX MASS GRAMS	9.77	16.88	51.91	10.71
FUEL KG (LB)	.455 (1.00)	.678 (1.50)	1.799 (3.97)	.435 (.96)
KW HR (HP HR)	1.38 (1.86)	2.27 (3.04)	7.20 (9.65)	1.36 (1.82)
BSHC G/KW HR (G/HP HR)	4.14 (3.09)	4.42 (3.29)	1.09 (.81)	4.33 (3.23)
BSCO G/KW HR (G/HP HR)	5.09 (3.80)	3.69 (2.75)	1.31 (.97)	4.34 (3.24)
BSCO2 G/KW HR (G/HP HR)	1032.47 (769.91)	938.00 (699.47)	795.67 (593.33)	1005.30 (749.65)
BSNOX G/KW HR (G/HP HR)	7.06 (5.26)	7.44 (5.55)	7.21 (5.38)	7.88 (5.88)
BSFC KG/KW HR (LB/HP HR)	.329 (.540)	.299 (.491)	.250 (.411)	.320 (.526)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.21 (16.37)
BSHC G/KW HR (G/HP HR)	2.42 (1.80)
BSCO G/KW HR (G/HP HR)	2.52 (1.88)
BSCO2 G/KW HR (G/HP HR)	872. (650.)
BSNOX G/KW HR (G/HP HR)	7.31 (5.45)
BSFC KG/KW HR (LB/HP HR)	.276 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.752 (26.57)
MULTIPLIER FOR	G/TEST	1.605
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1315 (.0981)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4767 (.2163)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D291H RUN2
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-56. PCT
ABSOLUTE HUMIDITY 12.6 GM/KG(88.1 GRAINS/LB)

NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.5 (10542.)	302.5 (10685.)	307.6 (10864.)	299.4 (10576.)
HC SAMPLE METER/RANGE/PPM	7.6/23/ 38.	12.9/23/ 65.	10.3/23/ 52.	8.6/23/ 43.
HC BCKGRD METER/RANGE/PPM	7.8/ 2/ 8.	7.3/ 2/ 7.	7.3/ 2/ 7.	7.2/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	22.4/13/ 20.	27.3/13/ 25.	31.3/13/ 29.	20.8/13/ 19.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	.7/13/ 1.	.6/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	26.4/ 3/ .43	59.3/ 3/ 1.05	18.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	4.8/13/ 14.	8.8/13/ 26.	28.7/13/ 86.	5.3/13/ 16.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.9/ 2/ 1.	1.2/ 2/ 1.	1.0/ 2/ 1.
DILUTION FACTOR	43.16	30.39	12.68	43.58
HC CONCENTRATION PPM	30.	58.	45.	36.
CO CONCENTRATION PPM	19.	24.	27.	18.
CO2 CONCENTRATION PCT	.27	.39	1.01	.26
NOX CONCENTRATION PPM	13.7	25.6	85.0	14.9
HC MASS GRAMS	5.22	10.03	7.98	6.24
CO MASS GRAMS	6.75	8.37	9.75	6.21
CO2 MASS GRAMS	1453.3	2180.6	5686.9	1414.6
NOX MASS GRAMS	7.83	14.83	50.02	8.52
FUEL KG (LB)	.462 (1.02)	.694 (1.53)	1.787 (3.94)	.451 (.99)
KW HR (HP HR)	1.40 (1.87)	2.29 (3.08)	7.20 (9.65)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	3.74 (2.79)	4.37 (3.26)	1.11 (.83)	4.63 (3.45)
BSCO G/KW HR (G/HP HR)	4.83 (3.60)	3.65 (2.72)	1.36 (1.01)	4.61 (3.44)
BSCO2 G/KW HR (G/HP HR)	1040.56 (775.95)	950.39 (708.71)	790.38 (589.39)	1050.40 (783.28)
BSNOX G/KW HR (G/HP HR)	5.61 (4.18)	6.46 (4.82)	6.95 (5.18)	6.33 (4.72)
BSFC KG/KW HR (LB/HP HR)	.331 (.544)	.303 (.498)	.248 (.408)	.335 (.550)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.23 (16.40)
BSHC G/KW HR (G/HP HR)	2.41 (1.80)
BSCO G/KW HR (G/HP HR)	2.54 (1.89)
BSCO2 G/KW HR (G/HP HR)	878. (654.)
BSNOX G/KW HR (G/HP HR)	6.64 (4.95)
BSFC KG/KW HR (LB/HP HR)	.277 (.456)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.758 (26.76)
MULTIPLIER FOR	G/TEST	1.594
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1303 (.0972)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4697 (.2131)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO. D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO. D29-1 RUN3
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.1 GM/KG(84.5 GRAINS/LB)
NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	370.8 (14.6)	370.8 (14.6)	370.8 (14.6)	370.8 (14.6)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10536.)	302.4 (10679.)	307.4 (10858.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	12.7/23/ 64.	10.3/23/ 52.	8.6/23/ 43.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.8/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	22.7/13/ 21.	27.3/13/ 25.	31.0/13/ 29.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.7/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.2/ 3/ .31	26.6/ 3/ .44	57.7/ 3/ 1.02	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.7/ 3/ .04	3.1/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	6.3/13/ 19.	10.4/13/ 31.	30.2/13/ 91.	6.7/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ 1.	.8/ 2/ 1.	1.0/ 2/ 1.	.8/ 2/ 1.
DILUTION FACTOR	42.68	30.16	13.07	43.11
HC CONCENTRATION PPM	32.	57.	45.	36.
CO CONCENTRATION PPM	20.	24.	27.	18.
CO2 CONCENTRATION PCT	.27	.40	.97	.26
NOX CONCENTRATION PPM	18.3	30.5	89.6	19.4
HC MASS GRAMS	5.52	9.94	8.02	6.23
CO MASS GRAMS	6.80	8.35	9.61	6.17
CO2 MASS GRAMS	1462.8	2190.7	5481.0	1416.1
NOX MASS GRAMS	10.44	17.63	52.68	11.13
FUEL KG (LB)	.465 (1.03)	.698 (1.54)	1.723 (3.80)	.451 (.99)
KW HR (HP HR)	1.41 (1.89)	2.27 (3.04)	7.20 (9.65)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	3.92 (2.92)	4.38 (3.27)	1.11 (.83)	4.62 (3.45)
BSCO G/KW HR (G/HP HR)	4.83 (3.60)	3.68 (2.75)	1.34 (1.00)	4.58 (3.41)
BSCO2 G/KW HR (G/HP HR)	1038.11 (774.12)	965.26 (719.80)	761.76 (568.04)	1051.52 (784.12)
BSNOX G/KW HR (G/HP HR)	7.41 (5.52)	7.77 (5.79)	7.32 (5.46)	8.26 (6.16)
BSFC KG/KW HR (LB/HP HR)	.330 (.543)	.307 (.505)	.239 (.394)	.335 (.551)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.22 (16.39)
BSHC G/KW HR (G/HP HR)	2.43 (1.81)
BSCO G/KW HR (G/HP HR)	2.53 (1.89)
BSCO2 G/KW HR (G/HP HR)	863. (644.)
BSNOX G/KW HR (G/HP HR)	7.52 (5.61)
BSFC KG/KW HR (LB/HP HR)	.273 (.449)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.753 (26.61)
MULTIPLIER FOR	G/TEST	1.602
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1311 (.0978)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4803 (.2178)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN4
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.5 (10542.)	302.5 (10685.)	307.6 (10864.)	299.4 (10576.)
HC SAMPLE METER/RANGE/PPM	8.3/23/ 41.	12.8/23/ 64.	10.5/23/ 52.	8.8/23/ 44.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	7.3/ 2/ 7.	6.9/ 2/ 7.	6.8/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	24.0/13/ 22.	27.8/13/ 25.	32.5/13/ 30.	21.4/13/ 20.
CO BCKGRD METER/RANGE/PPM	.9/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.8/ 3/ .30	26.2/ 3/ .43	59.6/ 3/ 1.06	18.4/ 3/ .29
CO2 BCKGRD METER/RANGE/PCT	2.3/ 3/ .04	2.8/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.1/13/ 18.	10.1/13/ 30.	29.7/13/ 89.	6.4/13/ 19.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.56	30.64	12.60	44.53
HC CONCENTRATION PPM	34.	57.	46.	37.
CO CONCENTRATION PPM	21.	24.	28.	18.
CO2 CONCENTRATION PCT	.27	.39	1.02	.25
NOX CONCENTRATION PPM	18.1	29.9	88.6	19.0
HC MASS GRAMS	5.82	9.91	8.17	6.47
CO MASS GRAMS	7.17	8.47	9.97	6.34
CO2 MASS GRAMS	1459.4	2144.7	5736.5	1385.8
NOX MASS GRAMS	10.33	17.33	52.15	10.86
FUEL KG (LB)	.465 (1.02)	.683 (1.51)	1.803 (3.97)	.442 (.97)
KW HR (HP HR)	1.38 (1.86)	2.27 (3.04)	7.20 (9.65)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.21 (3.14)	4.37 (3.26)	1.14 (.85)	4.85 (3.62)
BSCO G/KW HR (G/HP HR)	5.18 (3.86)	3.73 (2.78)	1.39 (1.03)	4.75 (3.54)
BSCO2 G/KW HR (G/HP HR)	1054.39 (786.26)	944.98 (704.67)	797.28 (594.53)	1038.62 (774.50)
BSNOX G/KW HR (G/HP HR)	7.46 (5.57)	7.64 (5.69)	7.25 (5.40)	8.14 (6.07)
BSFC KG/KW HR (LB/HP HR)	.336 (.552)	.301 (.495)	.251 (.412)	.331 (.545)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.18 (16.34)
BSHC G/KW HR (G/HP HR)	2.49 (1.86)
BSCO G/KW HR (G/HP HR)	2.62 (1.96)
BSCO2 G/KW HR (G/HP HR)	880. (657.)
BSNOX G/KW HR (G/HP HR)	7.44 (5.55)
BSFC KG/KW HR (LB/HP HR)	.278 (.458)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.760 (26.86)
MULTIPLIER FOR	G/TEST	1.589
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1304 (.0972)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4682 (.2124)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN5
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.98 MM HG(29.33 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.7 GM/KG(81.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6379.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10534.)	302.3 (10677.)	307.3 (10854.)	299.2 (10568.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	13.0/23/ 65.	10.4/23/ 52.	8.9/23/ 45.
HC BCKGRD METER/RANGE/PPM	6.5/ 2/ 7.	6.3/ 2/ 6.	6.4/ 2/ 6.	6.2/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	21.3/13/ 19.	25.9/13/ 24.	28.6/13/ 26.	19.8/13/ 18.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.3/13/ 0.	.5/13/ 0.	.4/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	18.9/ 3/ .30	26.1/ 3/ .43	59.2/ 3/ 1.05	18.6/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.0/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	6.3/13/ 19.	10.4/13/ 31.	29.9/13/ 90.	6.5/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	43.39	30.76	12.70	44.06
HC CONCENTRATION PPM	33.	59.	46.	39.
CO CONCENTRATION PPM	19.	23.	25.	17.
CO2 CONCENTRATION PCT	.26	.38	1.00	.25
NOX CONCENTRATION PPM	18.5	31.0	89.1	19.1
HC MASS GRAMS	5.60	10.28	8.20	6.65
CO MASS GRAMS	6.48	8.02	8.88	6.00
CO2 MASS GRAMS	1418.3	2116.9	5638.7	1378.5
NOX MASS GRAMS	10.57	17.90	52.38	10.95
FUEL KG (LB)	.451 (.99)	.675 (1.49)	1.772 (3.91)	.440 (.97)
KW HR (HP HR)	1.37 (1.84)	2.27 (3.04)	7.18 (9.63)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.08 (3.05)	4.53 (3.38)	1.14 (.85)	4.94 (3.68)
BSCO G/KW HR (G/HP HR)	4.72 (3.52)	3.54 (2.64)	1.24 (.92)	4.46 (3.32)
BSCO2 G/KW HR (G/HP HR)	1033.99 (771.04)	932.74 (695.54)	785.04 (585.41)	1023.60 (763.30)
BSNOX G/KW HR (G/HP HR)	7.71 (5.75)	7.89 (5.88)	7.29 (5.44)	8.14 (6.07)
BSFC KG/KW HR (LB/HP HR)	.329 (.541)	.297 (.489)	.247 (.406)	.326 (.537)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.17 (16.32)
BSHC G/KW HR (G/HP HR)	2.53 (1.88)
BSCO G/KW HR (G/HP HR)	2.41 (1.80)
BSCO2 G/KW HR (G/HP HR)	867. (647.)
BSNOX G/KW HR (G/HP HR)	7.54 (5.63)
BSFC KG/KW HR (LB/HP HR)	.274 (.451)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.748 (26.40)
MULTIPLIER FOR	G/TEST	1.615
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1327 (.0989)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4838 (.2194)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN6
DATE 7/ 8/81
TIME
DYNO NO. 5

PROJECT NO. 05-6598-001

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(80.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6210.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10527.)	302.1 (10670.)	307.2 (10850.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	8.3/23/ 41.	13.5/23/ 67.	11.0/23/ 55.	9.8/23/ 49.
HC BCKGRD METER/RANGE/PPM	8.7/ 2/ 9.	9.7/ 2/ 10.	9.7/ 2/ 10.	9.4/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	22.5/13/ 21.	26.1/13/ 24.	29.9/13/ 27.	21.4/13/ 20.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.7/13/ 1.	.6/13/ 1.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.6/ 3/ .30	26.2/ 3/ .43	58.6/ 3/ 1.04	17.7/ 3/ .28
CO2 BCKGRD METER/RANGE/PCT	2.3/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04	2.3/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.1/13/ 18.	10.0/13/ 30.	28.9/13/ 87.	6.4/13/ 19.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.8/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	44.07	30.62	12.84	46.27
HC CONCENTRATION PPM	33.	58.	46.	40.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.26	.39	1.00	.25
NOX CONCENTRATION PPM	18.0	29.7	85.9	18.5
HC MASS GRAMS	5.65	10.12	8.16	6.86
CO MASS GRAMS	6.82	7.96	9.27	6.41
CO2 MASS GRAMS	1439.0	2166.5	5625.8	1360.5
NOX MASS GRAMS	10.26	17.17	50.51	10.57
FUEL KG (LB)	.458 (1.01)	.690 (1.52)	1.768 (3.90)	.434 (.96)
KW HR (HP HR)	1.40 (1.87)	2.28 (3.06)	7.18 (9.63)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.04 (3.02)	4.43 (3.31)	1.14 (.85)	5.14 (3.84)
BSCO G/KW HR (G/HP HR)	4.89 (3.64)	3.49 (2.60)	1.29 (.96)	4.81 (3.58)
BSCO2 G/KW HR (G/HP HR)	1030.32 (768.31)	949.37 (707.95)	783.24 (584.06)	1019.68 (760.38)
BSNOX G/KW HR (G/HP HR)	7.35 (5.48)	7.52 (5.61)	7.03 (5.24)	7.92 (5.91)
BSFC KG/KW HR (LB/HP HR)	.328 (.539)	.302 (.497)	.246 (.405)	.326 (.535)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.20 (16.35)
BSHC G/KW HR (G/HP HR)	2.52 (1.88)
BSCO G/KW HR (G/HP HR)	2.50 (1.86)
BSCO2 G/KW HR (G/HP HR)	868. (648.)
BSNOX G/KW HR (G/HP HR)	7.26 (5.41)
BSFC KG/KW HR (LB/HP HR)	.275 (.452)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.746 (26.34)
MULTIPLIER FOR	G/TEST	1.618
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1327 (.0989)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4829 (.2190)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

PROJECT NO. 05-6597-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN1
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.25 MM HG(29.38 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-71. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(79.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.7 (10691.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	40.4/23/ 202.	27.5/23/ 138.	15.6/23/ 78.	10.4/23/ 52.
HC BCKGRD METER/RANGE/PPM	6.6/ 2/ 7.	6.3/ 2/ 6.	6.4/ 2/ 6.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	52.6/13/ 50.	44.4/13/ 42.	35.9/13/ 33.	23.4/13/ 21.
CO BCKGRD METER/RANGE/PPM	1.4/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.1/ 3/ .36	28.4/ 3/ .47	61.0/ 3/ 1.08	18.9/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	2.5/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	5.7/13/ 17.	9.2/13/ 28.	28.2/13/ 85.	6.0/13/ 18.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.1/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	35.03	27.63	12.25	43.19
HC CONCENTRATION PPM	196.	131.	72.	46.
CO CONCENTRATION PPM	47.	39.	31.	20.
CO2 CONCENTRATION PCT	.31	.43	1.04	.26
NOX CONCENTRATION PPM	17.0	27.4	84.1	17.6
HC MASS GRAMS	33.72	22.95	12.83	7.90
CO MASS GRAMS	16.39	13.82	11.01	6.88
CO2 MASS GRAMS	1703.2	2385.9	5882.1	1441.5
NOX MASS GRAMS	9.70	15.87	49.52	10.09
FUEL KG (LB)	.573 (1.26)	.774 (1.71)	1.853 (4.09)	.461 (1.02)
KW HR (HP HR)	1.52 (2.04)	2.31 (3.09)	7.36 (9.87)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	22.16 (16.53)	9.95 (7.42)	1.74 (1.30)	5.87 (4.38)
BSCO G/KW HR (G/HP HR)	10.78 (8.04)	5.99 (4.47)	1.50 (1.12)	5.11 (3.81)
BSCO2 G/KW HR (G/HP HR)	1119.53 (834.84)	1034.25 (771.24)	799.50 (596.19)	1070.34 (798.15)
BSNOX G/KW HR (G/HP HR)	6.38 (4.75)	6.88 (5.13)	6.73 (5.02)	7.49 (5.59)
BSFC KG/KW HR (LB/HP HR)	.377 (.619)	.336 (.552)	.252 (.414)	.342 (.563)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.53 (16.81)
BSHC G/KW HR (G/HP HR)	6.18 (4.61)
BSCO G/KW HR (G/HP HR)	3.84 (2.86)
BSCO2 G/KW HR (G/HP HR)	911. (679.)
BSNOX G/KW HR (G/HP HR)	6.80 (5.07)
BSFC KG/KW HR (LB/HP HR)	.292 (.480)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.812 (28.69)
MULTIPLIER FOR	G/TEST	1.488
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1187 (.0885)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4064 (.1843)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN1
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-61. PCT , CVS-67. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(83.7 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6211.	6274.	6380.	6211.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	299.7 (10584.)	302.7 (10691.)	307.8 (10872.)	299.7 (10584.)
HC SAMPLE METER/RANGE/PPM	8.7/23/ 44.	13.4/23/ 67.	10.9/23/ 54.	9.2/23/ 46.
HC BCKGRD METER/RANGE/PPM	7.1/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.	6.9/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	26.1/13/ 24.	28.6/13/ 26.	19.9/13/ 18.
CO BCKGRD METER/RANGE/PPM	.5/13/ 0.	.2/13/ 0.	.2/13/ 0.	.2/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	27.0/ 3/ .44	60.4/ 3/ 1.07	18.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	2.9/ 3/ .04	3.0/ 3/ .05	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.2/13/ 18.	10.6/13/ 32.	31.6/13/ 95.	6.7/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	43.07	29.67	12.42	43.55
HC CONCENTRATION PPM	37.	60.	48.	39.
CO CONCENTRATION PPM	20.	23.	25.	17.
CO2 CONCENTRATION PCT	.26	.40	1.03	.26
NOX CONCENTRATION PPM	18.4	31.5	94.3	19.9
HC MASS GRAMS	6.34	10.51	8.50	6.00
CO MASS GRAMS	7.04	8.11	8.95	6.09
CO2 MASS GRAMS	1417.8	2215.7	5798.9	1432.3
NOX MASS GRAMS	10.53	18.23	55.52	11.42
FUEL KG (LB)	.452 (1.00)	.706 (1.56)	1.822 (4.02)	.457 (1.01)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.37 (9.88)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.54 (3.39)	4.53 (3.38)	1.15 (.86)	5.09 (3.80)
BSCO G/KW HR (G/HP HR)	5.04 (3.76)	3.50 (2.61)	1.21 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1015.14 (756.99)	955.31 (712.37)	786.86 (586.76)	1073.44 (800.47)
BSNOX G/KW HR (G/HP HR)	7.54 (5.62)	7.86 (5.86)	7.53 (5.62)	8.56 (6.38)
BSFC KG/KW HR (LB/HP HR)	.324 (.532)	.304 (.500)	.247 (.406)	.342 (.563)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)		12.42 (16.66)
BSHC	G/KW HR (G/HP HR)	2.59 (1.93)
BSCO	G/KW HR (G/HP HR)	2.43 (1.81)
BSCO2	G/KW HR (G/HP HR)	875. (652.)
BSNOX	G/KW HR (G/HP HR)	7.71 (5.75)
BSFC	KG/KW HR (LB/HP HR)	.277 (.455)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.849 (29.99)
MULTIPLIER FOR	G/TEST	1.425
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1147 (.0856)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4146 (.1881)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN2
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.5 GM/KG(80.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.6 (10547.)	302.7 (10690.)	307.8 (10870.)	299.6 (10582.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	13.7/23/ 68.	10.9/23/ 55.	7.0/23/ 35.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	5.8/ 2/ 6.	6.2/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	22.0/13/ 20.	25.7/13/ 24.	28.3/13/ 26.	20.3/13/ 18.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.3/13/ 0.	.1/13/ 0.	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	18.7/ 3/ .30	26.3/ 3/ .43	59.2/ 3/ 1.05	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	6.3/13/ 19.	10.6/13/ 32.	31.4/13/ 94.	9.4/13/ 28.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.79	30.50	12.70	43.23
HC CONCENTRATION PPM	38.	63.	49.	29.
CO CONCENTRATION PPM	19.	23.	25.	18.
CO2 CONCENTRATION PCT	.26	.39	1.01	.26
NOX CONCENTRATION PPM	18.6	31.6	93.9	27.7
HC MASS GRAMS	6.56	10.96	8.67	5.05
CO MASS GRAMS	6.71	7.97	8.91	6.13
CO2 MASS GRAMS	1409.7	2163.7	5671.3	1417.5
NOX MASS GRAMS	10.64	18.31	55.27	15.87
FUEL KG (LB)	.450 (.99)	.690 (1.52)	1.782 (3.93)	.450 (.99)
KW HR (HP HR)	1.36 (1.82)	2.26 (3.03)	7.27 (9.75)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.83 (3.60)	4.86 (3.62)	1.19 (.89)	3.75 (2.80)
BSCO G/KW HR (G/HP HR)	4.94 (3.68)	3.53 (2.63)	1.23 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1037.16 (773.41)	958.62 (714.85)	780.10 (581.72)	1052.56 (784.90)
BSNOX G/KW HR (G/HP HR)	7.83 (5.84)	8.11 (6.05)	7.60 (5.67)	11.78 (8.78)
BSFC KG/KW HR (LB/HP HR)	.331 (.544)	.306 (.503)	.245 (.403)	.334 (.550)

TOTAL TEST RESULTS 4 BAGS

TOTAL	KW HR (HP HR)	12.23 (16.40)
BSHC	G/KW HR (G/HP HR)	2.55 (1.90)
BSCO	G/KW HR (G/HP HR)	2.43 (1.81)
BSCO2	G/KW HR (G/HP HR)	872. (650.)
BSNOX	G/KW HR (G/HP HR)	8.18 (6.10)
BSFC	KG/KW HR (LB/HP HR)	.276 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.835 (29.48)
MULTIPLIER FOR	G/TEST	1.448
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1184 (.0883)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4294 (.1948)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN3
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-68. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(80.1 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6275.	6380.	6210.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.8 (10694.)	307.8 (10873.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	8.1/23/ 40.	10.9/23/ 54.	10.4/23/ 52.	9.2/23/ 46.
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 6.	5.7/ 2/ 6.	5.8/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	23.7/13/ 22.	27.3/13/ 25.	30.7/13/ 28.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.9/13/ 1.	1.0/13/ 1.	1.1/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	26.5/ 3/ .43	59.2/ 3/ 1.05	17.7/ 3/ .28
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.5/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.3/13/ 19.	12.6/13/ 38.	32.0/13/ 96.	6.8/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.11	30.34	12.70	46.33
HC CONCENTRATION PPM	35.	49.	47.	40.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.27	.40	1.01	.24
NOX CONCENTRATION PPM	18.9	37.5	95.3	20.0
HC MASS GRAMS	5.98	8.55	8.31	6.94
CO MASS GRAMS	7.05	8.25	9.38	6.13
CO2 MASS GRAMS	1454.3	2200.4	5696.5	1322.0
NOX MASS GRAMS	10.78	21.71	56.14	11.45
FUEL KG (LB)	.463 (1.02)	.699 (1.54)	1.790 (3.95)	.422 (.93)
KW HR (HP HR)	1.38 (1.86)	2.33 (3.13)	7.34 (9.85)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.32 (3.22)	3.67 (2.73)	1.13 (.84)	5.20 (3.88)
BSCO G/KW HR (G/HP HR)	5.09 (3.80)	3.54 (2.64)	1.28 (.95)	4.59 (3.43)
BSCO2 G/KW HR (G/HP HR)	1050.64 (783.47)	943.64 (703.67)	775.58 (578.35)	990.77 (738.82)
BSNOX G/KW HR (G/HP HR)	7.79 (5.81)	9.31 (6.94)	7.64 (5.70)	8.58 (6.40)
BSFC KG/KW HR (LB/HP HR)	.335 (.550)	.300 (.493)	.244 (.401)	.317 (.520)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.40 (16.62)
BSHC G/KW HR (G/HP HR)	2.40 (1.79)
BSCO G/KW HR (G/HP HR)	2.49 (1.85)
BSCO2 G/KW HR (G/HP HR)	861. (642.)
BSNOX G/KW HR (G/HP HR)	8.07 (6.02)
BSFC KG/KW HR (LB/HP HR)	.272 (.448)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.749 (26.47)
MULTIPLIER FOR	G/TEST	1.613
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1301 (.0971)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4780 (.2168)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN4
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-54. PCT , CVS-68. PCT
ABSOLUTE HUMIDITY 11.7 GM/KG(81.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.7 (10690.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	12.7/23/ 63.	10.4/23/ 52.	6.9/23/ 34.
HC BCKGRD METER/RANGE/PPM	5.2/ 2/ 5.	5.0/ 2/ 5.	4.9/ 2/ 5.	4.8/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	23.4/13/ 21.	26.9/13/ 25.	31.3/13/ 29.	22.3/13/ 20.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.8/13/ 1.	1.0/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.9/ 3/ .30	26.7/ 3/ .44	60.0/ 3/ 1.06	18.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	3.2/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.0/13/ 18.	10.5/13/ 32.	30.8/13/ 92.	9.4/13/ 28.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.8/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	43.37	30.04	12.51	43.69
HC CONCENTRATION PPM	34.	59.	47.	30.
CO CONCENTRATION PPM	20.	23.	27.	19.
CO2 CONCENTRATION PCT	.26	.40	1.02	.26
NOX CONCENTRATION PPM	17.8	31.1	91.6	27.6
HC MASS GRAMS	5.87	10.22	8.42	5.14
CO MASS GRAMS	6.98	8.16	9.60	6.54
CO2 MASS GRAMS	1420.3	2194.5	5737.4	1415.6
NOX MASS GRAMS	10.17	18.04	53.94	15.84
FUEL KG (LB)	.452 (1.00)	.699 (1.54)	1.803 (3.98)	.450 (.99)
KW HR (HP HR)	1.36 (1.82)	2.33 (3.13)	7.32 (9.82)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.32 (3.22)	4.38 (3.27)	1.15 (.86)	3.82 (2.85)
BSCO G/KW HR (G/HP HR)	5.14 (3.83)	3.51 (2.62)	1.31 (.98)	4.86 (3.62)
BSCO2 G/KW HR (G/HP HR)	1044.95 (779.22)	941.10 (701.78)	783.82 (584.49)	1051.12 (783.82)
BSNOX G/KW HR (G/HP HR)	7.48 (5.58)	7.73 (5.77)	7.37 (5.50)	11.76 (8.77)
BSFC KG/KW HR (LB/HP HR)	.333 (.547)	.300 (.493)	.246 (.405)	.334 (.549)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.36 (16.57)
BSHC G/KW HR (G/HP HR)	2.40 (1.79)
BSCO G/KW HR (G/HP HR)	2.53 (1.89)
BSCO2 G/KW HR (G/HP HR)	871. (650.)
BSNOX G/KW HR (G/HP HR)	7.93 (5.91)
BSFC KG/KW HR (LB/HP HR)	.276 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.746 (26.36)
MULTIPLIER FOR	G/TEST	1.620
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1311 (.0977)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4758 (.2158)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUNS
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-62. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.6 (10547.)	302.7 (10690.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	12.7/23/ 63.	10.1/23/ 51.	8.9/23/ 44.
HC BCKGRD METER/RANGE/PPM	5.0/ 2/ 5.	4.8/ 2/ 5.	4.9/ 2/ 5.	4.8/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	25.6/13/ 23.	25.4/13/ 23.	29.0/13/ 27.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.5/13/ 0.	.6/13/ 1.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.4/ 3/ .31	26.7/ 3/ .44	60.3/ 3/ 1.07	18.7/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	3.0/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	6.2/13/ 19.	10.5/13/ 31.	31.8/13/ 95.	6.3/13/ 19.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR	42.12	30.05	12.45	43.80
HC CONCENTRATION PPM	39.	59.	46.	40.
CO CONCENTRATION PPM	22.	22.	25.	18.
CO2 CONCENTRATION PCT	.27	.40	1.03	.26
NOX CONCENTRATION PPM	18.1	31.0	94.9	18.2
HC MASS GRAMS	6.78	10.25	8.17	6.86
CO MASS GRAMS	7.69	7.81	8.98	6.26
CO2 MASS GRAMS	1466.5	2194.5	5787.2	1431.1
NOX MASS GRAMS	10.37	17.95	55.88	10.45
FUEL KG (LB)	.468 (1.03)	.699 (1.54)	1.818 (4.01)	.456 (1.01)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.38 (9.90)	1.37 (1.84)
BSHC G/KW HR (G/HP HR)	4.86 (3.62)	4.42 (3.30)	1.11 (.83)	5.00 (3.73)
BSCO G/KW HR (G/HP HR)	5.51 (4.11)	3.37 (2.51)	1.22 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1050.01 (782.99)	946.16 (705.55)	783.94 (584.59)	1043.34 (778.02)
BSNOX G/KW HR (G/HP HR)	7.42 (5.53)	7.74 (5.77)	7.57 (5.64)	7.62 (5.68)
BSFC KG/KW HR (LB/HP HR)	.335 (.551)	.301 (.495)	.246 (.405)	.333 (.547)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.47 (16.72)
BSHC G/KW HR (G/HP HR)	2.57 (1.92)
BSCO G/KW HR (G/HP HR)	2.47 (1.84)
BSCO2 G/KW HR (G/HP HR)	872. (651.)
BSNOX G/KW HR (G/HP HR)	7.59 (5.66)
BSFC KG/KW HR (LB/HP HR)	.276 (.454)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.755 (26.68)
MULTIPLIER FOR	G/TEST	1.600
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1283 (.0957)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4650 (.2109)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-1. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6570-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTD903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN6
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.74 MM HG(29.36 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.5 GM/KG(80.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6189.	6274.	6379.	6211.
TIME SECONDS	295.9	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.5 (10542.)	302.6 (10686.)	307.6 (10865.)	299.5 (10579.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	14.0/23/ 70.	11.1/23/ 56.	10.2/23/ 51.
HC BCKGRD METER/RANGE/PPM	5.2/ 2/ 5.	4.8/ 2/ 5.	4.8/ 2/ 5.	4.7/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	27.4/13/ 25.	30.7/13/ 28.	21.9/13/ 20.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.1/13/ 1.	1.3/13/ 1.	1.5/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.2/ 3/ .31	26.8/ 3/ .44	59.4/ 3/ 1.05	18.5/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.1/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	6.2/13/ 19.	10.6/13/ 32.	31.4/13/ 94.	6.5/13/ 20.
NOX BCKGRD METER/RANGE/PPM	1.2/ 2/ 1.	.8/ 2/ 1.	1.1/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR	42.60	29.88	12.65	44.18
HC CONCENTRATION PPM	39.	65.	51.	46.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.27	.40	1.01	.25
NOX CONCENTRATION PPM	17.5	30.9	93.3	19.0
HC MASS GRAMS	6.75	11.42	9.10	8.00
CO MASS GRAMS	6.96	8.27	9.34	6.34
CO2 MASS GRAMS	1455.4	2203.4	5674.9	1362.4
NOX MASS GRAMS	10.00	17.89	54.91	10.86
FUEL KG (LB)	.464 (1.02)	.703 (1.55)	1.784 (3.93)	.436 (.96)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.34 (9.85)	1.37 (1.84)
BSHC G/KW HR (G/HP HR)	4.83 (3.60)	4.92 (3.67)	1.24 (.92)	5.83 (4.35)
BSCO G/KW HR (G/HP HR)	4.99 (3.72)	3.57 (2.66)	1.27 (.95)	4.62 (3.45)
BSCO2 G/KW HR (G/HP HR)	1042.05 (777.05)	950.00 (708.42)	772.65 (576.17)	993.23 (740.65)
BSNOX G/KW HR (G/HP HR)	7.16 (5.34)	7.71 (5.75)	7.48 (5.58)	7.92 (5.90)
BSFC KG/KW HR (LB/HP HR)	.332 (.546)	.303 (.498)	.243 (.399)	.318 (.523)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.43 (16.67)
BSHC G/KW HR (G/HP HR)	2.84 (2.12)
BSCO G/KW HR (G/HP HR)	2.49 (1.85)
BSCO2 G/KW HR (G/HP HR)	860. (642.)
BSNOX G/KW HR (G/HP HR)	7.53 (5.62)
BSFC KG/KW HR (LB/HP HR)	.272 (.448)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.709 (25.03)
MULTIPLIER FOR	G/TEST	1.705
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1371 (.1023)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.5033 (.2283)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x

C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN1
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 28.9 DEG C(84.0 DEG F)

RELATIVE HUMIDITY , ENGINE-50. PCT , CVS-59. PCT
ABSOLUTE HUMIDITY 12.8 GM/KG(89.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6379.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.4 (10541.)	302.5 (10684.)	307.6 (10863.)	299.5 (10579.)
HC SAMPLE METER/RANGE/PPM	36.9/23/ 184.	25.1/23/ 125.	15.4/23/ 77.	10.1/23/ 51.
HC BCKGRD METER/RANGE/PPM	10.5/ 2/ 11.	10.0/ 2/ 10.	10.0/ 2/ 10.	9.9/ 2/ 10.
CO SAMPLE METER/RANGE/PPM	50.9/13/ 48.	43.3/13/ 40.	37.3/13/ 35.	22.7/13/ 21.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	1.0/13/ 1.	1.0/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	21.5/ 3/ .35	28.1/ 3/ .46	60.8/ 3/ 1.08	19.2/ 3/ .31
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.4/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	13.3/ 2/ 13.	21.1/ 2/ 21.	65.3/ 2/ 65.	13.6/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	36.19	28.01	12.29	42.52
HC CONCENTRATION PPM	174.	116.	68.	41.
CO CONCENTRATION PPM	46.	38.	32.	19.
CO2 CONCENTRATION PCT	.31	.42	1.03	.26
NOX CONCENTRATION PPM	13.1	20.8	64.7	13.1
HC MASS GRAMS	29.98	20.18	12.06	7.08
CO MASS GRAMS	16.04	13.56	11.60	6.77
CO2 MASS GRAMS	1670.1	2330.3	5807.2	1452.2
NOX MASS GRAMS	7.48	12.04	38.09	7.51
FUEL KG (LB)	.559 (1.23)	.754 (1.66)	1.830 (4.03)	.463 (1.02)
KW HR (HP HR)	1.38 (1.86)	2.24 (3.01)	7.21 (9.67)	1.32 (1.77)
BSHC G/KW HR (G/HP HR)	21.66 (16.15)	8.99 (6.70)	1.67 (1.25)	5.36 (4.00)
BSCO G/KW HR (G/HP HR)	11.59 (8.64)	6.04 (4.50)	1.61 (1.20)	5.12 (3.82)
BSCO2 G/KW HR (G/HP HR)	1206.56 (899.73)	1038.21 (774.19)	805.70 (600.81)	1098.66 (819.27)
BSNOX G/KW HR (G/HP HR)	5.41 (4.03)	5.37 (4.00)	5.29 (3.94)	5.68 (4.24)
BSFC KG/KW HR (LB/HP HR)	.404 (.664)	.336 (.552)	.254 (.417)	.351 (.576)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.16 (16.30)
BSHC G/KW HR (G/HP HR)	5.70 (4.25)
BSCO G/KW HR (G/HP HR)	3.95 (2.94)
BSCO2 G/KW HR (G/HP HR)	926. (691.)
BSNOX G/KW HR (G/HP HR)	5.36 (3.99) (bag)
BSFC KG/KW HR (LB/HP HR)	.297 (.488)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.733 (25.89)
MULTIPLIER FOR	G/TEST	1.648
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1355 (.1011)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4570 (.2073)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D291H RUN1
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.24 MM HG(29.34 IN HG)
DRY BULB TEMP. 29.4 DEG C(85.0 DEG F)

RELATIVE HUMIDITY , ENGINE-48. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.6 GM/KG(88.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.4 (10538.)	302.4 (10681.)	307.5 (10860.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	8.4/23/ 42.	13.2/23/ 66.	10.5/23/ 52.	8.5/23/ 43.
HC BCKGRD METER/RANGE/PPM	9.0/ 2/ 9.	8.8/ 2/ 9.	8.8/ 2/ 9.	8.8/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	26.8/13/ 25.	29.9/13/ 27.	19.4/13/ 18.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.1/13/ 0.	.2/13/ 0.	.3/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	19.1/ 3/ .31	26.3/ 3/ .43	59.8/ 3/ 1.06	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.1/ 3/ .05	3.0/ 3/ .05	3.7/ 3/ .06
NOX SAMPLE METER/RANGE/PPM	13.8/ 2/ 14.	23.8/ 2/ 24.	72.7/ 2/ 73.	14.4/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	42.86	30.50	12.56	43.13
HC CONCENTRATION PPM	33.	57.	44.	34.
CO CONCENTRATION PPM	20.	24.	26.	17.
CO2 CONCENTRATION PCT	.26	.38	1.02	.25
NOX CONCENTRATION PPM	13.4	23.3	72.1	13.9
HC MASS GRAMS	5.73	10.03	7.86	5.88
CO MASS GRAMS	7.05	8.38	9.39	5.91
CO2 MASS GRAMS	1429.1	2128.8	5724.9	1366.4
NOX MASS GRAMS	7.65	13.49	42.43	7.97
FUEL KG (LB)	.455 (1.00)	.678 (1.50)	1.799 (3.97)	.435 (.96)
KW HR (HP HR)	1.38 (1.86)	2.27 (3.04)	7.20 (9.65)	1.36 (1.82)
BSHC G/KW HR (G/HP HR)	4.14 (3.09)	4.42 (3.29)	1.09 (.81)	4.33 (3.23)
BSCO G/KW HR (G/HP HR)	5.09 (3.80)	3.69 (2.75)	1.31 (.97)	4.34 (3.24)
BSCO2 G/KW HR (G/HP HR)	1032.47 (769.91)	938.00 (699.47)	795.67 (593.33)	1005.30 (749.65)
BSNOX G/KW HR (G/HP HR)	5.53 (4.12)	5.94 (4.43)	5.90 (4.40)	5.86 (4.37)
BSFC KG/KW HR (LB/HP HR)	.329 (.540)	.299 (.491)	.250 (.411)	.320 (.526)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.21 (16.37)
BSHC G/KW HR (G/HP HR)	2.42 (1.80)
BSCO G/KW HR (G/HP HR)	2.52 (1.88)
BSCO2 G/KW HR (G/HP HR)	872. (650.)
BSNOX G/KW HR (G/HP HR)	5.86 (4.37) (bag)
BSFC KG/KW HR (LB/HP HR)	.276 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.752 (26.57)
MULTIPLIER FOR	G/TEST	1.605
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1315 (.0981)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4767 (.2163)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D291H RUN2
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 30.0 DEG C(86.0 DEG F)

RELATIVE HUMIDITY , ENGINE-49. PCT , CVS-56. PCT
ABSOLUTE HUMIDITY 13.2 GM/KG(92.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.5 (10542.)	302.5 (10685.)	307.6 (10864.)	299.4 (10576.)
HC SAMPLE METER/RANGE/PPM	7.6/23/ 38.	12.9/23/ 65.	10.3/23/ 52.	8.6/23/ 43.
HC BCKGRD METER/RANGE/PPM	7.8/ 2/ 8.	7.3/ 2/ 7.	7.3/ 2/ 7.	7.2/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	22.4/13/ 20.	27.3/13/ 25.	31.3/13/ 29.	20.8/13/ 19.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	.7/13/ 1.	.6/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	26.4/ 3/ .43	59.3/ 3/ 1.05	18.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.1/ 2/ 14.	24.2/ 2/ 24.	72.6/ 2/ 73.	14.7/ 2/ 15.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.9/ 2/ 1.	1.2/ 2/ 1.	1.0/ 2/ 1.
DILUTION FACTOR	43.16	30.39	12.68	43.58
HC CONCENTRATION PPM	30.	58.	45.	36.
CO CONCENTRATION PPM	19.	24.	27.	18.
CO2 CONCENTRATION PCT	.27	.39	1.01	.26
NOX CONCENTRATION PPM	13.5	23.3	71.5	13.7
HC MASS GRAMS	5.22	10.03	7.98	6.24
CO MASS GRAMS	6.75	8.37	9.75	6.21
CO2 MASS GRAMS	1453.3	2180.6	5686.9	1414.6
NOX MASS GRAMS	7.72	13.50	42.07	7.86
FUEL KG (LB)	.462 (1.02)	.694 (1.53)	1.787 (3.94)	.451 (.99)
KW HR (HP HR)	1.40 (1.87)	2.29 (3.08)	7.20 (9.65)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	3.74 (2.79)	4.37 (3.26)	1.11 (.83)	4.63 (3.45)
BSCO G/KW HR (G/HP HR)	4.83 (3.60)	3.65 (2.72)	1.36 (1.01)	4.61 (3.44)
BSCO2 G/KW HR (G/HP HR)	1040.56 (775.95)	950.39 (708.71)	790.38 (589.39)	1050.40 (783.28)
BSNOX G/KW HR (G/HP HR)	5.52 (4.12)	5.88 (4.39)	5.85 (4.36)	5.84 (4.35)
BSFC KG/KW HR (LB/HP HR)	.331 (.544)	.303 (.498)	.248 (.408)	.335 (.550)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.23 (16.40)
BSHC G/KW HR (G/HP HR)	2.41 (1.80)
BSCO G/KW HR (G/HP HR)	2.54 (1.89)
BSCO2 G/KW HR (G/HP HR)	878. (654.)
BSNOX G/KW HR (G/HP HR)	5.82 (4.34) (bag)
BSFC KG/KW HR (LB/HP HR)	.277 (.456)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.758 (26.76)
MULTIPLIER FOR	G/TEST	1.594
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1303 (.0972)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4697 (.2131)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN3
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 30.0 DEG C(86.0 DEG F)

RELATIVE HUMIDITY , ENGINE-48. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.9 GM/KG(90.5 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	370.8 (14.6)	370.8 (14.6)	370.8 (14.6)	370.8 (14.6)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10536.)	302.4 (10679.)	307.4 (10858.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	12.7/23/ 64.	10.3/23/ 52.	8.6/23/ 43.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.8/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	22.7/13/ 21.	27.3/13/ 25.	31.0/13/ 29.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.7/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.2/ 3/ .31	26.6/ 3/ .44	57.7/ 3/ 1.02	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.7/ 3/ .04	3.1/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	14.4/ 2/ 14.	24.2/ 2/ 24.	70.2/ 2/ 70.	6.7/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ 1.	.8/ 2/ 1.	1.0/ 2/ 1.	.8/ 2/ 1.
DILUTION FACTOR	42.68	30.16	13.07	43.11
HC CONCENTRATION PPM	32.	57.	45.	36.
CO CONCENTRATION PPM	20.	24.	27.	18.
CO2 CONCENTRATION PCT	.27	.40	.97	.26
NOX CONCENTRATION PPM	13.7	23.4	69.3	19.4
HC MASS GRAMS	5.52	9.94	8.02	6.23
CO MASS GRAMS	6.80	8.35	9.61	6.17
CO2 MASS GRAMS	1462.8	2190.7	5481.0	1416.1
NOX MASS GRAMS	7.83	13.55	40.74	11.13
FUEL KG (LB)	.465 (1.03)	.698 (1.54)	1.723 (3.80)	.451 (.99)
KW HR (HP HR)	1.41 (1.89)	2.27 (3.04)	7.20 (9.65)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	3.92 (2.92)	4.38 (3.27)	1.11 (.83)	4.62 (3.45)
BSCO G/KW HR (G/HP HR)	4.83 (3.60)	3.68 (2.75)	1.34 (1.00)	4.58 (3.41)
BSCO2 G/KW HR (G/HP HR)	1038.11 (774.12)	965.26 (719.80)	761.76 (568.04)	1051.52 (784.12)
BSNOX G/KW HR (G/HP HR)	5.55 (4.14)	5.97 (4.45)	5.66 (4.22)	8.26 (6.16)
BSFC KG/KW HR (LB/HP HR)	.330 (.543)	.307 (.505)	.239 (.394)	.335 (.551)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.22 (16.39)
BSHC G/KW HR (G/HP HR)	2.43 (1.81)
BSCO G/KW HR (G/HP HR)	2.53 (1.89)
BSCO2 G/KW HR (G/HP HR)	863. (644.)
BSNOX G/KW HR (G/HP HR)	5.99 (4.47)(bag)
BSFC KG/KW HR (LB/HP HR)	.273 (.449)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.753 (26.61)
MULTIPLIER FOR	G/TEST	1.602
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1311 (.0978)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4803 (.2178)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN4
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 745.49 MM HG(29.35 IN HG)
DRY BULB TEMP. 30.0 DEG C(86.0 DEG F)

RELATIVE HUMIDITY , ENGINE-47. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 12.6 GM/KG(88.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.5 (10542.)	302.5 (10685.)	307.6 (10864.)	299.4 (10576.)
HC SAMPLE METER/RANGE/PPM	8.3/23/ 41.	12.8/23/ 64.	10.5/23/ 52.	8.8/23/ 44.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	7.3/ 2/ 7.	6.9/ 2/ 7.	6.8/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	24.0/13/ 22.	27.8/13/ 25.	32.5/13/ 30.	21.4/13/ 20.
CO BCKGRD METER/RANGE/PPM	.9/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.8/ 3/ .30	26.2/ 3/ .43	59.6/ 3/ 1.06	18.4/ 3/ .29
CO2 BCKGRD METER/RANGE/PCT	2.3/ 3/ .04	2.8/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.1/ 2/ 14.	23.9/ 2/ 24.	72.8/ 2/ 73.	14.0/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.56	30.64	12.60	44.53
HC CONCENTRATION PPM	34.	57.	46.	37.
CO CONCENTRATION PPM	21.	24.	28.	18.
CO2 CONCENTRATION PCT	.27	.39	1.02	.25
NOX CONCENTRATION PPM	13.8	23.6	72.3	13.6
HC MASS GRAMS	5.82	9.91	8.17	6.47
CO MASS GRAMS	7.17	8.47	9.97	6.34
CO2 MASS GRAMS	1459.4	2144.7	5736.5	1305.8
NOX MASS GRAMS	7.88	13.66	42.56	7.79
FUEL KG (LB)	.465 (1.02)	.683 (1.51)	1.803 (3.97)	.442 (.97)
KW HR (HP HR)	1.38 (1.86)	2.27 (3.04)	7.20 (9.65)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.21 (3.14)	4.37 (3.26)	1.14 (.85)	4.85 (3.62)
BSCO G/KW HR (G/HP HR)	5.18 (3.86)	3.73 (2.78)	1.39 (1.03)	4.75 (3.54)
BSCO2 G/KW HR (G/HP HR)	1054.39 (786.26)	944.98 (704.67)	797.28 (594.53)	1038.62 (774.50)
BSNOX G/KW HR (G/HP HR)	5.70 (4.25)	6.02 (4.49)	5.92 (4.41)	5.84 (4.36)
BSFC KG/KW HR (LB/HP HR)	.336 (.552)	.301 (.495)	.251 (.412)	.331 (.545)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.18 (16.34)
BSHC G/KW HR (G/HP HR)	2.49 (1.86)
BSCO G/KW HR (G/HP HR)	2.62 (1.96)
BSCO2 G/KW HR (G/HP HR)	880. (657.)
BSNOX G/KW HR (G/HP HR)	5.90 (4.40)(bag)
BSFC KG/KW HR (LB/HP HR)	.278 (.458)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.760 (26.86)
MULTIPLIER FOR	G/TEST	1.589
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1304 (.0972)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4682 (.2124)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN5
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.98 MM HG(29.33 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.0 GM/KG(76.9 GRAINS/LB)
NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6379.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10534.)	302.3 (10677.)	307.3 (10854.)	299.2 (10568.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	13.0/23/ 65.	10.4/23/ 52.	8.9/23/ 45.
HC BCKGRD METER/RANGE/PPM	6.5/ 2/ 7.	6.3/ 2/ 6.	6.4/ 2/ 6.	6.2/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	21.3/13/ 19.	25.9/13/ 24.	28.6/13/ 26.	19.8/13/ 18.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.3/13/ 0.	.5/13/ 0.	.4/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	18.9/ 3/ .30	26.1/ 3/ .43	59.2/ 3/ 1.05	18.6/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.0/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	14.4/ 2/ 14.	24.3/ 2/ 24.	72.8/ 2/ 73.	14.1/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	43.39	30.76	12.70	44.06
HC CONCENTRATION PPM	33.	59.	46.	39.
CO CONCENTRATION PPM	19.	23.	25.	17.
CO2 CONCENTRATION PCT	.26	.38	1.00	.25
NOX CONCENTRATION PPM	14.1	24.0	72.2	13.6
HC MASS GRAMS	5.60	10.28	8.20	6.65
CO MASS GRAMS	6.48	8.02	8.88	6.00
CO2 MASS GRAMS	1418.3	2116.9	5638.7	1378.5
NOX MASS GRAMS	8.05	13.88	42.47	7.79
FUEL KG (LB)	.451 (.99)	.675 (1.49)	1.772 (3.91)	.440 (.97)
KW HR (HP HR)	1.37 (1.84)	2.27 (3.04)	7.18 (9.63)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.08 (3.05)	4.53 (3.38)	1.14 (.85)	4.94 (3.68)
BSCO G/KW HR (G/HP HR)	4.72 (3.52)	3.54 (2.64)	1.24 (.92)	4.46 (3.32)
BSCO2 G/KW HR (G/HP HR)	1033.99 (771.04)	932.74 (695.54)	785.04 (585.41)	1023.60 (763.30)
BSNOX G/KW HR (G/HP HR)	5.87 (4.38)	6.12 (4.56)	5.91 (4.41)	5.78 (4.31)
BSFC KG/KW HR (LB/HP HR)	.329 (.541)	.297 (.489)	.247 (.406)	.326 (.537)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.17 (16.32)
BSHC G/KW HR (G/HP HR)	2.53 (1.88)
BSCO G/KW HR (G/HP HR)	2.41 (1.80)
BSCO2 G/KW HR (G/HP HR)	867. (647.)
BSNOX G/KW HR (G/HP HR)	5.93 (4.42)(bag)
BSFC KG/KW HR (LB/HP HR)	.274 (.451)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.748 (26.40)
MULTIPLIER FOR	G/TEST	1.615
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1327 (.0989)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4838 (.2194)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-1 RUN6
DATE 7/ 8/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(80.9 GRAINS/LB)

NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6210.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10527.)	302.1 (10670.)	307.2 (10850.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	8.3/23/ 41.	13.5/23/ 67.	11.0/23/ 55.	9.8/23/ 49.
HC BCKGRD METER/RANGE/PPM	8.7/ 2/ 9.	9.7/ 2/ 10.	9.7/ 2/ 10.	9.4/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	22.5/13/ 21.	26.1/13/ 24.	29.9/13/ 27.	21.4/13/ 20.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.7/13/ 1.	.6/13/ 1.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.6/ 3/ .30	26.2/ 3/ .43	58.6/ 3/ 1.04	17.7/ 3/ .28
CO2 BCKGRD METER/RANGE/PCT	2.3/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04	2.3/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.3/ 2/ 14.	23.7/ 2/ 24.	71.1/ 2/ 71.	13.7/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.8/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	44.07	30.62	12.84	46.27
HC CONCENTRATION PPM	33.	58.	46.	40.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.26	.39	1.00	.25
NOX CONCENTRATION PPM	13.9	23.3	70.4	13.1
HC MASS GRAMS	5.65	10.12	8.16	6.86
CO MASS GRAMS	6.82	7.96	9.27	6.41
CO2 MASS GRAMS	1439.0	2166.5	5625.8	1360.5
NOX MASS GRAMS	7.93	13.47	41.35	7.50
FUEL KG (LB)	.458 (1.01)	.690 (1.52)	1.768 (3.90)	.434 (.96)
KW HR (HP HR)	1.40 (1.87)	2.28 (3.06)	7.18 (9.63)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.04 (3.02)	4.43 (3.31)	1.14 (.85)	5.14 (3.84)
BSCO G/KW HR (G/HP HR)	4.89 (3.64)	3.49 (2.60)	1.29 (.96)	4.81 (3.58)
BSCO2 G/KW HR (G/HP HR)	1030.32 (768.31)	949.37 (707.95)	783.24 (584.06)	1019.68 (760.38)
BSNOX G/KW HR (G/HP HR)	5.68 (4.23)	5.90 (4.40)	5.76 (4.29)	5.62 (4.19)
BSFC KG/KW HR (LB/HP HR)	.328 (.539)	.302 (.497)	.246 (.405)	.326 (.535)

TOTAL TEST RESULTS 4 B
TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.20 (16.35)
BSHC G/KW HR (G/HP HR)	2.52 (1.88)
BSCO G/KW HR (G/HP HR)	2.50 (1.86)
BSCO2 G/KW HR (G/HP HR)	868. (648.)
BSNOX G/KW HR (G/HP HR)	5.76 (4.30) (bag)
BSFC KG/KW HR (LB/HP HR)	.275 (.452)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.746 (26.34)
MULTIPLIER FOR	G/TEST	1.618
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1327 (.0989)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4829 (.2190)

20 X 20 FILTERS

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
C-TRANS.

PROJECT NO. 05-6597-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN1
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.25 MM HG(29.38 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-71. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(79.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.7 (10691.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	40.4/23/ 202.	27.5/23/ 138.	15.6/23/ 78.	10.4/23/ 52.
HC BCKGRD METER/RANGE/PPM	6.6/ 2/ 7.	6.3/ 2/ 6.	6.4/ 2/ 6.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	52.6/13/ 50.	44.4/13/ 42.	35.9/13/ 33.	23.4/13/ 21.
CO BCKGRD METER/RANGE/PPM	1.4/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.1/ 3/ .36	28.4/ 3/ .47	61.0/ 3/ 1.08	18.9/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	2.5/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	13.9/ 2/ 14.	22.2/ 2/ 22.	69.0/ 2/ 69.	14.0/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.1/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	35.03	27.63	12.25	43.19
HC CONCENTRATION PPM	196.	131.	72.	46.
CO CONCENTRATION PPM	47.	39.	31.	20.
CO2 CONCENTRATION PCT	.31	.43	1.04	.26
NOX CONCENTRATION PPM	13.8	22.1	68.5	13.7
HC MASS GRAMS	33.72	22.95	12.83	7.90
CO MASS GRAMS	16.39	13.82	11.01	6.88
CO2 MASS GRAMS	1703.2	2385.9	5882.1	1441.5
NOX MASS GRAMS	7.89	12.80	40.36	7.86
FUEL KG (LB)	.573 (1.26)	.774 (1.71)	1.853 (4.09)	.461 (1.02)
KW HR (HP HR)	1.52 (2.04)	2.31 (3.09)	7.36 (9.87)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	22.16 (16.53)	9.95 (7.42)	1.74 (1.30)	5.87 (4.38)
BSCO G/KW HR (G/HP HR)	10.78 (8.04)	5.99 (4.47)	1.50 (1.12)	5.11 (3.81)
BSCO2 G/KW HR (G/HP HR)	1119.53 (834.84)	1034.25 (771.24)	799.50 (596.19)	1070.34 (798.15)
BSNOX G/KW HR (G/HP HR)	5.18 (3.87)	5.55 (4.14)	5.49 (4.09)	5.83 (4.35)
BSFC KG/KW HR (LB/HP HR)	.377 (.619)	.336 (.552)	.252 (.414)	.342 (.563)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.53 (16.81)
BSHC G/KW HR (G/HP HR)	6.18 (4.61)
BSCO G/KW HR (G/HP HR)	3.84 (2.86)
BSCO2 G/KW HR (G/HP HR)	911. (679.)
BSNOX G/KW HR (G/HP HR)	5.50 (4.10) (bag)
BSFC KG/KW HR (LB/HP HR)	.292 (.480)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.812 (28.69)
MULTIPLIER FOR	G/TEST	1.488
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1187 (.0885)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4064 (.1843)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN1
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-61. PCT , CVS-67. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(83.7 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6211.	6274.	6380.	6211.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	299.7 (10584.)	302.7 (10691.)	307.8 (10872.)	299.7 (10584.)
HC SAMPLE METER/RANGE/PPM	8.7/23/ 44.	13.4/23/ 67.	10.9/23/ 54.	9.2/23/ 46.
HC BCKGRD METER/RANGE/PPM	7.1/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.	6.9/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	26.1/13/ 24.	28.6/13/ 26.	19.9/13/ 18.
CO BCKGRD METER/RANGE/PPM	.5/13/ 0.	.2/13/ 0.	.2/13/ 0.	.2/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	27.0/ 3/ .44	60.4/ 3/ 1.07	10.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	2.9/ 3/ .04	3.0/ 3/ .05	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	13.8/ 2/ 14.	24.3/ 2/ 24.	75.7/ 2/ 76.	14.4/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	43.07	29.67	12.42	43.55
HC CONCENTRATION PPM	37.	60.	48.	39.
CO CONCENTRATION PPM	20.	23.	25.	17.
CO2 CONCENTRATION PCT	.26	.40	1.03	.26
NOX CONCENTRATION PPM	13.7	24.1	75.2	14.1
HC MASS GRAMS	6.34	10.51	8.50	6.80
CO MASS GRAMS	7.04	8.11	8.95	6.09
CO2 MASS GRAMS	1417.8	2215.7	5798.9	1432.3
NOX MASS GRAMS	7.85	13.96	44.30	8.09
FUEL KG (LB)	.452 (1.00)	.706 (1.56)	1.822 (4.02)	.457 (1.01)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.37 (9.88)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.54 (3.39)	4.53 (3.38)	1.15 (.86)	5.09 (3.80)
BSCO G/KW HR (G/HP HR)	5.04 (3.76)	3.50 (2.61)	1.21 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1015.14 (756.99)	955.31 (712.37)	786.86 (586.76)	1073.44 (800.47)
BSNOX G/KW HR (G/HP HR)	5.62 (4.19)	6.02 (4.49)	6.01 (4.48)	6.06 (4.52)
BSFC KG/KW HR (LB/HP HR)	.324 (.532)	.304 (.500)	.247 (.406)	.342 (.563)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)		12.42 (16.66)
BSHC	G/KW HR (G/HP HR)	2.59 (1.93)
BSCO	G/KW HR (G/HP HR)	2.43 (1.81)
BSCO2	G/KW HR (G/HP HR)	875. (652.)
BSNOX	G/KW HR (G/HP HR)	5.97 (4.46) (bag)
BSFC	KG/KW HR (LB/HP HR)	.277 (.455)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.849 (29.99)
MULTIPLIER FOR	G/TEST	1.425
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1147 (.0856)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4146 (.1881)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN2
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.5 GM/KG(80.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)	368.3 (14.5)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.6 (10547.)	302.7 (10690.)	307.8 (10870.)	299.6 (10582.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	13.7/23/ 68.	10.9/23/ 55.	7.0/23/ 35.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	5.8/ 2/ 6.	6.2/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	22.0/13/ 20.	25.7/13/ 24.	28.3/13/ 26.	20.3/13/ 18.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.3/13/ 0.	.1/13/ 0.	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	18.7/ 3/ .30	26.3/ 3/ .43	59.2/ 3/ 1.05	19.0/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	13.9/ 2/ 14.	24.2/ 2/ 24.	74.4/ 2/ 74.	14.6/ 2/ 15.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.79	30.50	12.70	43.23
HC CONCENTRATION PPM	38.	63.	49.	29.
CO CONCENTRATION PPM	19.	23.	25.	18.
CO2 CONCENTRATION PCT	.26	.39	1.01	.26
NOX CONCENTRATION PPM	13.7	24.0	73.9	14.2
HC MASS GRAMS	6.56	10.96	8.67	5.05
CO MASS GRAMS	6.71	7.97	8.91	6.13
CO2 MASS GRAMS	1409.7	2163.7	5671.3	1417.5
NOX MASS GRAMS	7.83	13.90	43.53	8.14
FUEL KG (LB)	.450 (.99)	.690 (1.52)	1.782 (3.93)	.450 (.99)
KW HR (HP HR)	1.36 (1.82)	2.26 (3.03)	7.27 (9.75)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.83 (3.60)	4.86 (3.62)	1.19 (.89)	3.75 (2.80)
BSCO G/KW HR (G/HP HR)	4.94 (3.68)	3.53 (2.63)	1.23 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1037.16 (773.41)	958.62 (714.85)	780.10 (581.72)	1052.56 (784.90)
BSNOX G/KW HR (G/HP HR)	5.76 (4.29)	6.16 (4.59)	5.99 (4.47)	6.05 (4.51)
BSFC KG/KW HR (LB/HP HR)	.331 (.544)	.306 (.503)	.245 (.403)	.334 (.550)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.23 (16.40)
BSHC G/KW HR (G/HP HR)	2.55 (1.90)
BSCO G/KW HR (G/HP HR)	2.43 (1.81)
BSCO2 G/KW HR (G/HP HR)	872. (650.)
BSNOX G/KW HR (G/HP HR)	6.00 (4.47) (bag)
BSFC KG/KW HR (LB/HP HR)	.276 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.835 (29.48)
MULTIPLIER FOR	G/TEST	1.448
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1184 (.0883)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4294 (.1948)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NOx
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 77 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN3
DATE 7/ 7/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-68. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(80.1 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6275.	6380.	6210.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.8 (10694.)	307.8 (10873.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	8.1/23/ 40.	10.9/23/ 54.	10.4/23/ 52.	9.2/23/ 46.
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 6.	5.7/ 2/ 6.	5.8/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	23.7/13/ 22.	27.3/13/ 25.	30.7/13/ 28.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.9/13/ 1.	1.0/13/ 1.	1.1/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.0/ 3/ .30	26.5/ 3/ .43	59.2/ 3/ 1.05	17.7/ 3/ .28
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.5/ 3/ .04	2.6/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.1/ 2/ 14.	25.0/ 2/ 25.	74.0/ 2/ 74.	13.7/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	43.11	30.34	12.70	46.33
HC CONCENTRATION PPM	35.	49.	47.	40.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.27	.40	1.01	.24
NOX CONCENTRATION PPM	14.0	24.6	73.4	13.3
HC MASS GRAMS	5.98	8.55	8.31	6.94
CO MASS GRAMS	7.05	8.25	9.38	6.13
CO2 MASS GRAMS	1454.3	2200.4	5696.5	1322.0
NOX MASS GRAMS	8.00	14.26	43.25	7.63
FUEL KG (LB)	.463 (1.02)	.699 (1.54)	1.790 (3.95)	.422 (.93)
KW HR (HP HR)	1.38 (1.86)	2.33 (3.13)	7.34 (9.85)	1.33 (1.79)
BSHC G/KW HR (G/HP HR)	4.32 (3.22)	3.67 (2.73)	1.13 (.84)	5.20 (3.88)
BSCO G/KW HR (G/HP HR)	5.09 (3.80)	3.54 (2.64)	1.28 (.95)	4.59 (3.43)
BSCO2 G/KW HR (G/HP HR)	1050.64 (783.47)	943.64 (703.67)	775.58 (578.35)	990.77 (738.82)
BSNOX G/KW HR (G/HP HR)	5.78 (4.31)	6.11 (4.56)	5.89 (4.39)	5.72 (4.26)
BSFC KG/KW HR (LB/HP HR)	.335 (.550)	.300 (.493)	.244 (.401)	.317 (.520)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.40 (16.62)	
BSHC G/KW HR (G/HP HR)	2.40 (1.79)	
BSCO G/KW HR (G/HP HR)	2.49 (1.85)	
BSCO2 G/KW HR (G/HP HR)	861. (642.)	
BSNOX G/KW HR (G/HP HR)	5.90 (4.40)	(bag)
BSFC KG/KW HR (LB/HP HR)	.272 (.448)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.749 (26.47)
MULTIPLIER FOR	G/TEST	1.613
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1301 (.0971)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4780 (.2168)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN4
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM 465 F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-54. PCT , CVS-68. PCT
ABSOLUTE HUMIDITY 11.7 GM/KG(81.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.7 (10549.)	302.7 (10690.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	7.8/23/ 39.	12.7/23/ 63.	10.4/23/ 52.	6.9/23/ 34.
HC BCKGRD METER/RANGE/PPM	5.2/ 2/ 5.	5.0/ 2/ 5.	4.9/ 2/ 5.	4.8/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	23.4/13/ 21.	26.9/13/ 25.	31.3/13/ 29.	22.3/13/ 20.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.8/13/ 1.	1.0/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	18.9/ 3/ .30	26.7/ 3/ .44	60.0/ 3/ 1.06	18.8/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	3.2/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.3/ 2/ 14.	25.0/ 2/ 25.	75.9/ 2/ 76.	14.7/ 2/ 15.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.8/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	43.37	30.04	12.51	43.69
HC CONCENTRATION PPM	34.	59.	47.	30.
CO CONCENTRATION PPM	20.	23.	27.	19.
CO2 CONCENTRATION PCT	.26	.40	1.02	.26
NOX CONCENTRATION PPM	14.0	24.6	75.2	14.1
HC MASS GRAMS	5.07	10.22	8.42	5.14
CO MASS GRAMS	6.98	8.10	9.60	6.54
CO2 MASS GRAMS	1420.3	2194.5	5737.4	1415.6
NOX MASS GRAMS	8.00	14.25	44.26	8.09
FUEL KG (LB)	.452 (1.00)	.699 (1.54)	1.803 (3.98)	.450 (.99)
KW HR (HP HR)	1.36 (1.82)	2.33 (3.13)	7.32 (9.82)	1.35 (1.81)
BSHC G/KW HR (G/HP HR)	4.32 (3.22)	4.38 (3.27)	1.15 (.86)	3.82 (2.85)
BSCO G/KW HR (G/HP HR)	5.14 (3.83)	3.51 (2.62)	1.31 (.98)	4.86 (3.62)
BSCO2 G/KW HR (G/HP HR)	1044.95 (779.22)	941.10 (701.78)	783.82 (584.49)	1051.12 (783.82)
BSNOX G/KW HR (G/HP HR)	5.89 (4.39)	6.11 (4.56)	6.05 (4.51)	6.01 (4.48)
BSFC KG/KW HR (LB/HP HR)	.333 (.547)	.300 (.493)	.246 (.405)	.334 (.549)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.36 (16.57)	
BSHC G/KW HR (G/HP HR)	2.40 (1.79)	
BSCO G/KW HR (G/HP HR)	2.53 (1.89)	
BSCO2 G/KW HR (G/HP HR)	871. (650.)	
BSNOX G/KW HR (G/HP HR)	6.04 (4.50)	(bag)
BSFC KG/KW HR (LB/HP HR)	.276 (.453)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.746 (26.36)
MULTIPLIER FOR	G/TEST	1.620
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1311 (.0977)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4758 (.2158)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.029-2 RUN5
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 746.00 MM HG(29.37 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-62. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6190.	6274.	6380.	6211.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.6 (10547.)	302.7 (10690.)	307.8 (10871.)	299.6 (10583.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	12.7/23/ 63.	10.1/23/ 51.	8.9/23/ 44.
HC BCKGRD METER/RANGE/PPM	5.0/ 2/ 5.	4.8/ 2/ 5.	4.9/ 2/ 5.	4.8/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	25.3/13/ 23.	25.4/13/ 23.	29.0/13/ 27.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.5/13/ 0.	.6/13/ 1.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.4/ 3/ .31	26.7/ 3/ .44	60.3/ 3/ 1.07	18.7/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	3.0/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	14.5/ 2/ 15.	24.5/ 2/ 25.	75.1/ 2/ 75.	14.4/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR	42.12	30.05	12.45	43.00
HC CONCENTRATION PPM	39.	59.	46.	40.
CO CONCENTRATION PPM	22.	22.	25.	18.
CO2 CONCENTRATION PCT	.27	.40	1.03	.26
NOX CONCENTRATION PPM	14.1	24.1	74.5	13.7
HC MASS GRAMS	6.78	10.25	8.17	6.06
CO MASS GRAMS	7.69	7.81	8.98	6.26
CO2 MASS GRAMS	1466.5	2194.5	5787.2	1431.1
NOX MASS GRAMS	8.06	13.96	43.89	7.06
FUEL KG (LB)	.468 (1.03)	.699 (1.54)	1.818 (4.01)	.456 (1.01)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.38 (9.90)	1.37 (1.84)
BSHC G/KW HR (G/HP HR)	4.86 (3.62)	4.42 (3.30)	1.11 (.83)	5.00 (3.73)
BSCO G/KW HR (G/HP HR)	5.51 (4.11)	3.37 (2.51)	1.22 (.91)	4.56 (3.40)
BSCO2 G/KW HR (G/HP HR)	1050.01 (782.99)	946.16 (705.55)	783.94 (584.59)	1043.34 (778.02)
BSNOX G/KW HR (G/HP HR)	5.77 (4.30)	6.02 (4.49)	5.95 (4.43)	5.73 (4.27)
BSFC KG/KW HR (LB/HP HR)	.335 (.551)	.301 (.495)	.246 (.405)	.333 (.547)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.47 (16.72)	
BSHC G/KW HR (G/HP HR)	2.57 (1.92)	
BSCO G/KW HR (G/HP HR)	2.47 (1.84)	
BSCO2 G/KW HR (G/HP HR)	872. (651.)	
BSNOX G/KW HR (G/HP HR)	5.92 (4.41)	(bag)
BSFC KG/KW HR (LB/HP HR)	.276 (.454)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.755 (26.68)
MULTIPLIER FOR	G/TEST	1.600
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1283 (.0957)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.4650 (.2109)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-1. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D29
ENGINE MODEL 79 CUMMINS VTB903
ENGINE 0.0 L(0. CID) V-8
CVS NO. 10

TEST NO.D29-2 RUN6
DATE 7/ 9/81
TIME
DYNO NO. 5

DIESEL EM 465 F
BAG CART NO. 1

BAROMETER 745.74 MM HG(29.36 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS 60. PCT
ABSOLUTE HUMIDITY 11.5 GM/KG(80.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6189.	6274.	6379.	6211.
TIME SECONDS	295.9	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	290.5 (10542.)	302.6 (10686.)	307.6 (10865.)	299.5 (10579.)
HC SAMPLE METER/RANGE/PPM	8.9/23/ 44.	14.0/23/ 70.	11.1/23/ 56.	10.2/23/ 51.
HC BCKGRD METER/RANGE/PPM	5.2/ 2/ 5.	4.8/ 2/ 5.	4.8/ 2/ 5.	4.7/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	23.2/13/ 21.	27.4/13/ 25.	30.7/13/ 28.	21.9/13/ 20.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.1/13/ 1.	1.3/13/ 1.	1.5/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	19.2/ 3/ .31	26.8/ 3/ .44	59.4/ 3/ 1.05	18.5/ 3/ .30
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.1/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	15.5/ 2/ 16.	25.6/ 2/ 26.	74.7/ 2/ 75.	14.4/ 2/ 14.
NOX BCKGRD METER/RANGE/PPM	1.2/ 2/ 1.	.8/ 2/ 1.	1.1/ 2/ 1.	.7/ 2/ 1.
DILUTION FACTOR	42.60	29.88	12.65	44.18
HC CONCENTRATION PPM	39.	65.	51.	46.
CO CONCENTRATION PPM	20.	23.	26.	18.
CO2 CONCENTRATION PCT	.27	.40	1.01	.25
NOX CONCENTRATION PPM	14.3	24.8	73.7	13.7
HC MASS GRAMS	6.75	11.42	9.10	8.00
CO MASS GRAMS	6.96	8.27	9.34	6.34
CO2 MASS GRAMS	1455.4	2203.4	5674.9	1362.4
NOX MASS GRAMS	8.18	14.37	43.36	7.86
FUEL KG (LB)	.464 (1.02)	.703 (1.55)	1.784 (3.93)	.436 (.96)
KW HR (HP HR)	1.40 (1.87)	2.32 (3.11)	7.34 (9.85)	1.37 (1.84)
BSHC G/KW HR (G/HP HR)	4.83 (3.60)	4.92 (3.67)	1.24 (.92)	5.83 (4.35)
BSCO G/KW HR (G/HP HR)	4.99 (3.72)	3.57 (2.66)	1.27 (.95)	4.62 (3.45)
BSCO2 G/KW HR (G/HP HR)	1042.05 (777.05)	950.00 (708.42)	772.65 (576.17)	993.23 (740.65)
BSNOX G/KW HR (G/HP HR)	5.86 (4.37)	6.20 (4.62)	5.90 (4.40)	5.73 (4.27)
BSFC KG/KW HR (LB/HP HR)	.332 (.546)	.303 (.498)	.243 (.399)	.318 (.523)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	12.43 (16.67)	
BSHC G/KW HR (G/HP HR)	2.84 (2.12)	
BSCO G/KW HR (G/HP HR)	2.49 (1.85)	
BSCO2 G/KW HR (G/HP HR)	860. (642.)	
BSNOX G/KW HR (G/HP HR)	5.93 (4.42)	(bag)
BSFC KG/KW HR (LB/HP HR)	.272 (.448)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.709 (25.03)
MULTIPLIER FOR	G/TEST	1.705
MULTIPLIER FOR	G/KW HR (G/HP HR)	.1371 (.1023)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.5033 (.2283)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. 13-MODE FEDERAL DIESEL EMISSION CYCLE 1979

ENGINE: DDA 8V-71TA
TEST NO. D30-2 FUEL: EM-477-F PROJECT: 05-6598-001

BAROMETER 29.19
DATE: 07/21/81

MODE	POWER PCT	ENGINE SPEED COND / RPM	TORQUE OBS LB-FT	POWER OBS BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	INTAKE HUMID GR/LB	NOX CORR FACT	MEASURED HC PPM	MEASURED CO PPM	MEASURED CO2 PCT	MEASURED NOX PPM	CALCULATED GRAMS / HOUR HC	CALCULATED GRAMS / HOUR CO	CALCULATED GRAMS / HOUR NOX	MODE
1		IDLE / 500.	0.	.0	.046	10.76	82.	1.089	172.	119.	.94	165.	22.	31.	77.	1
2	2	INTER / 1260.	21.	5.0	.176	28.36	82.	1.085	264.	239.	1.36	125.	91.	165.	153.	2
3	25	INTER / 1260.	264.	63.3	.475	31.68	82.	1.067	148.	93.	3.31	360.	59.	73.	495.	3
4	50	INTER / 1260.	529.	126.9	.801	36.66	82.	1.054	148.	80.	4.87	675.	69.	73.	1053.	4
5	75	INTER / 1260.	793.	190.2	1.187	44.21	82.	1.045	132.	345.	5.76	965.	77.	391.	1863.	5
6	100	INTER / 1260.	1058.	253.8	1.569	53.30	83.	1.047	96.	1180.	6.32	1080.	67.	1591.	2407.	6
7		IDLE / 500.	0.	.0	.047	10.80	83.	1.102	172.	119.	.90	170.	24.	33.	86.	7
8	100	RATED / 2100.	864.	345.5	2.225	79.13	83.	1.049	104.	80.	6.00	865.	110.	164.	3034.	8
9	75	RATED / 2100.	653.	261.1	1.742	73.00	83.	1.058	112.	80.	4.87	635.	114.	158.	2165.	9
10	50	RATED / 2100.	432.	172.7	1.281	67.95	83.	1.069	136.	80.	3.93	400.	124.	144.	1253.	10
11	25	RATED / 2100.	220.	88.0	.823	59.17	82.	1.069	172.	80.	2.91	225.	135.	124.	610.	11
12	2	RATED / 2100.	17.	6.8	.391	52.34	82.	1.082	208.	106.	1.63	105.	135.	138.	242.	12
13		IDLE / 500.	0.	.0	.047	10.73	82.	1.088	208.	133.	.82	175.	31.	40.	94.	13

MODE	CALCULATED GRAMS/LB-FUEL HC	CALCULATED GRAMS/LB-FUEL CO	CALCULATED GRAMS/LB-FUEL NOX	CALCULATED GRAMS/BHP-HR HC	CALCULATED GRAMS/BHP-HR CO	CALCULATED GRAMS/BHP-HR NOX	F/A DRY MEAS	F/A STOICH	"PHI"	WET HC CORR FACT	F/A CALC	F/A PCT MEAS	POWER CORR FACT	BSFC CORR LB/HP-HR	MODAL WEIGHT FACTOR	MODE
1	8.14	11.34	27.92	************		******	.0043	.0695	.062	.989	.0046	6.4	.989	*****	.067	1
2	8.62	15.64	14.48	18.01	32.70	30.27	.0063	.0695	.090	.985	.0067	6.4	.994	2.103	.080	2
3	2.08	2.58	17.36	.93	1.16	7.81	.0152	.0695	.218	.969	.0156	2.9	.996	.452	.080	3
4	1.43	1.51	21.91	.54	.57	8.30	.0221	.0695	.318	.957	.0228	2.9	.999	.379	.080	4
5	1.09	5.48	26.16	.41	2.05	9.79	.0272	.0695	.391	.950	.0269	-.9	1.005	.373	.080	5
6	.71	16.90	26.41	.27	6.27	9.80	.0298	.0695	.429	.945	.0298	.1	1.012	.366	.080	6
7	8.49	11.82	30.36	************		******	.0044	.0695	.063	.989	.0044	-.2	.989	*****	.067	7
8	.83	1.23	22.72	.32	.47	8.78	.0285	.0695	.409	.948	.0279	-2.1	1.039	.372	.080	8
9	1.09	1.51	20.71	.43	.60	8.29	.0242	.0695	.348	.957	.0227	-5.8	1.031	.388	.080	9
10	1.62	1.87	16.30	.72	.83	7.25	.0191	.0695	.275	.964	.0185	-3.3	1.023	.435	.080	10
11	2.73	2.52	12.35	1.53	1.41	6.93	.0141	.0695	.202	.973	.0138	-2.1	1.016	.552	.080	11
12	5.77	5.89	10.30	19.93	20.33	35.56	.0076	.0695	.109	.983	.0078	3.7	1.010	3.419	.080	12
13	11.15	14.37	33.59	************		******	.0044	.0695	.063	.990	.0040	-8.1	.989	*****	.067	13

CYCLE COMPOSITE USING 13-MODE WEIGHT FACTORS

BSHC ---------- = .692 GRAM/BHP-HR
BSCO ---------- = 2.053 GRAM/BHP-HR
BSNOX --------- = 8.966 GRAM/BHP-HR
BSHC + BSNOX = 9.657 GRAM/BHP-HR
CORR. BSFC -- = .419 LBS/BHP-HR

TABLE A-2. 13-MODE FEDERAL DIESEL EMISSION CYCLE 1979

ENGINE:DDA 8V 71TA
TEST NO. D30-3   FUEL: EM-477-F   PROJECT:05-6598-001   BAROMETER 29.17
DATE:07/21/81

MODE	POWER PCT	ENGINE SPEED COND / RPM	TORQUE OBS LB-FT	POWER OBS BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	INTAKE HUMID GR/LB	NOX CORR FACT	MEASURED HC PPM	MEASURED CO PPM	MEASURED CO2 PCT	MEASURED NOX PPM	CALCULATED GRAMS / HOUR HC	CALCULATED GRAMS / HOUR CO	CALCULATED GRAMS / HOUR NOX	MODE
1		IDLE / 500.	0.	.0	.048	10.88	83.	1.085	168.	133.	.78	168.	27.	43.	97.	1
2	2	INTER / 1260.	21.	5.0	.172	20.44	83.	1.082	240.	252.	1.27	125.	86.	182.	159.	2
3	25	INTER / 1260.	263.	63.1	.461	31.75	83.	1.067	132.	93.	3.25	350.	52.	72.	475.	3
4	50	INTER / 1260.	527.	126.4	.809	37.31	83.	1.054	132.	93.	4.87	655.	62.	85.	1031.	4
5	75	INTER / 1260.	790.	189.5	1.177	44.61	83.	1.046	124.	345.	5.76	945.	72.	387.	1810.	5
6	100	INTER / 1260.	1054.	252.9	1.569	53.36	83.	1.041	92.	1194.	6.40	1065.	64.	1589.	2408.	6
7		IDLE / 500.	0.	.0	.045	10.91	83.	1.085	164.	119.	.82	170.	24.	35.	89.	7
8	100	RATED / 2100.	864.	345.5	2.246	79.05	83.	1.043	100.	80.	5.92	865.	109.	168.	3083.	8
9	75	RATED / 2100.	653.	261.1	1.764	73.64	83.	1.050	108.	66.	4.94	640.	109.	130.	2162.	9
10	50	RATED / 2100.	432.	172.7	1.277	65.84	85.	1.067	116.	66.	3.79	415.	104.	116.	1275.	10
11	25	RATED / 2100.	220.	88.0	.834	58.72	85.	1.078	168.	80.	2.91	235.	134.	126.	650.	11
12	2	RATED / 2100.	17.	6.8	.425	51.94	85.	1.070	200.	93.	1.63	110.	142.	132.	278.	12
13		IDLE / 500.	0.	.0	.049	10.78	85.	1.097	184.	119.	.86	175.	28.	36.	95.	13

MODE	CALCULATED GRAMS/LB-FUEL HC	GRAMS/LB-FUEL CO	GRAMS/LB-FUEL NOX	GRAMS/BHP-HR HC	GRAMS/BHP-HR CO	GRAMS/BHP-HR NOX	F/A DRY MEAS	F/A STOICH	"PHI"	WET HC CORR FACT	F/A CALC	F/A PCT MEAS	POWER CORR FACT	BSFC CORR LB/HP-HR	MODAL WEIGHT FACTOR	MODE
1	9.49	15.16	33.88	******	******	******	.0044	.0695	.064	.991	.0038	-13.2	.992	*****	.067	1
2	8.37	17.63	15.44	17.15	36.16	31.65	.0061	.0695	.088	.986	.0062	1.7	.997	2.056	.080	2
3	1.89	2.62	17.18	.83	1.15	7.53	.0147	.0695	.211	.970	.0153	4.4	.999	.438	.080	3
4	1.28	1.75	21.26	.49	.67	8.16	.0219	.0695	.316	.957	.0228	3.8	1.003	.383	.080	4
5	1.02	5.49	25.65	.30	2.04	9.55	.0267	.0695	.384	.949	.0269	.8	1.008	.369	.080	5
6	.68	16.89	25.58	.25	6.29	9.52	.0298	.0695	.428	.944	.0302	1.5	1.016	.366	.080	6
7	8.85	12.95	32.76	******	******	******	.0042	.0695	.061	.990	.0040	-4.5	.992	*****	.067	7
8	.81	1.24	22.88	.31	.49	8.93	.0287	.0695	.414	.949	.0275	-4.4	1.042	.374	.080	8
9	1.03	1.23	20.43	.42	.50	8.28	.0242	.0695	.349	.956	.0231	-4.9	1.037	.391	.080	9
10	1.36	1.52	16.65	.60	.67	7.38	.0196	.0695	.283	.964	.0187	-4.7	1.029	.431	.080	10
11	2.67	2.52	13.00	1.52	1.43	7.39	.0144	.0695	.207	.973	.0138	-4.2	1.021	.557	.080	11
12	5.56	5.17	10.88	20.85	19.41	40.83	.0083	.0695	.119	.983	.0078	-5.5	1.013	3.702	.080	12
13	9.47	12.34	32.49	******	******	******	.0046	.0695	.066	.990	.0042	-8.1	.991	*****	.067	13

CYCLE COMPOSITE USING 13-MODE WEIGHT FACTORS

BSHC ---------- = .662 GRAM/BHP-HR
BSCO ---------- = 2.041 GRAM/BHP-HR
BSNOX --------- = 8.980 GRAM/BHP-HR
BSHC + BSNOX = 9.641 GRAM/BHP-HR
CORR. BSFC -- = .421 LBS/BHP-HR

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN1
DATE 7/28/81
TIME 9:00
DYNO NO. 5

PROJECT NO. 05-6598-001

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY , ENGINE-61. PCT , CVS-73. PCT
ABSOLUTE HUMIDITY 10.5 GM/KG(73.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	185.4 (7.3)	185.4 (7.3)	185.4 (7.3)	185.4 (7.3)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6276.	6381.	6213.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.0 (10525.)	302.0 (10668.)	307.1 (10847.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	21.3/22/ 21.	29.8/22/ 30.	23.4/22/ 23.
HC BCKGRD METER/RANGE/PPM	5.5/ 2/ 6.	5.3/ 2/ 5.	5.9/ 2/ 6.	5.6/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	33.4/13/ 31.	23.9/13/ 22.	27.6/13/ 25.	46.6/13/ 44.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.9/13/ 1.	.8/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.8/ 3/ .40	33.7/ 3/ .56	76.7/ 3/ 1.40	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.7/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.1/14/ 21.	3.8/14/ 38.	14.4/14/ 144.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	32.69	23.66	9.52	35.96
HC CONCENTRATION PPM	23.	16.	25.	18.
CO CONCENTRATION PPM	29.	20.	23.	41.
CO2 CONCENTRATION PCT	.37	.52	1.36	.32
NOX CONCENTRATION PPM	20.6	37.6	143.3	26.8
HC MASS GRAMS	3.90	2.82	4.35	3.10
CO MASS GRAMS	10.12	7.15	8.37	14.44
CO2 MASS GRAMS	2011.5	2890.6	7666.3	1776.6
NOX MASS GRAMS	11.76	21.74	84.16	15.31
FUEL KG (LB)	.643 (1.42)	.918 (2.02)	2.426 (5.35)	.571 (1.26)
KW HR (HP HR)	1.70 (2.27)	2.89 (3.88)	9.65 (12.94)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	2.30 (1.71)	.97 (.73)	.45 (.34)	1.73 (1.29)
BSCO G/KW HR (G/HP HR)	5.97 (4.45)	2.47 (1.84)	.87 (.65)	8.04 (6.00)
BSCO2 G/KW HR (G/HP HR)	1186.07 (884.45)	999.17 (745.08)	794.30 (592.31)	989.37 (737.77)
BSNOX G/KW HR (G/HP HR)	6.93 (5.17)	7.52 (5.60)	8.72 (6.50)	8.52 (6.36)
BSFC KG/KW HR (LB/HP HR)	.379 (.624)	.317 (.522)	.251 (.413)	.318 (.522)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.04 (21.51)
BSHC G/KW HR (G/HP HR)	.88 (.66)
BSCO G/KW HR (G/HP HR)	2.50 (1.86)
BSCO2 G/KW HR (G/HP HR)	895. (667.)
BSNOX G/KW HR (G/HP HR)	8.29 (6.18)
BSFC KG/KW HR (LB/HP HR)	.284 (.467)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	1.008 (35.59)
MULTIPLIER FOR	G/TEST	1.197
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0746 (.0557)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2626 (.1191)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN1
DATE 7/28/81
TIME 9:40
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-70. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10538.)	302.3 (10679.)	307.5 (10859.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	16.7/22/ 17.	20.5/22/ 21.	29.9/22/ 30.	23.3/22/ 23.
HC BCKGRD METER/RANGE/PPM	7.4/ 2/ 7.	7.0/ 2/ 7.	6.7/ 2/ 7.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	53.3/13/ 51.	30.4/13/ 28.	25.7/13/ 24.	45.9/13/ 43.
CO BCKGRD METER/RANGE/PPM	.1/13/ 0.	.1/13/ 0.	.3/13/ 0.	.4/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.0/ 3/ .36	32.3/ 3/ .54	76.7/ 3/ 1.40	22.5/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.6/14/ 146.	2.8/14/ 28.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.2/ 2/ 0.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	36.98	24.74	9.53	36.13
HC CONCENTRATION PPM	10.	14.	24.	17.
CO CONCENTRATION PPM	49.	27.	22.	41.
CO2 CONCENTRATION PCT	.32	.50	1.36	.33
NOX CONCENTRATION PPM	26.0	45.4	144.8	27.0
HC MASS GRAMS	1.64	2.41	4.24	3.02
CO MASS GRAMS	17.01	9.49	7.92	14.44
CO2 MASS GRAMS	1748.9	2761.4	7683.1	1785.4
NOX MASS GRAMS	14.83	26.26	85.17	15.43
FUEL KG (LB)	.556 (1.22)	.869 (1.91)	2.405 (5.30)	.567 (1.25)
KW HR (HP HR)	1.81 (2.42)	3.08 (4.13)	9.64 (12.93)	1.81 (2.42)
BSHC G/KW HR (G/HP HR)	.91 (.68)	.78 (.58)	.44 (.33)	1.67 (1.25)
BSCO G/KW HR (G/HP HR)	9.41 (7.02)	3.08 (2.30)	.82 (.61)	7.99 (5.96)
BSCO2 G/KW HR (G/HP HR)	967.26 (721.28)	896.53 (668.54)	797.07 (594.37)	987.40 (736.30)
BSNOX G/KW HR (G/HP HR)	8.20 (6.11)	8.53 (6.36)	8.84 (6.59)	8.54 (6.37)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)	.282 (.464)	.250 (.410)	.314 (.516)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.34 (21.91)
BSHC G/KW HR (G/HP HR)	.69 (.52)
BSCO G/KW HR (G/HP HR)	2.99 (2.23)
BSCO2 G/KW HR (G/HP HR)	856. (638.)
BSNOX G/KW HR (G/HP HR)	8.67 (6.47)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	1.045 (36.92)
MULTIPLIER FOR	G/TEST	1.155
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0707 (.0527)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2627 (.1192)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN2
DATE 7/28/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.22 MM HG(29.30 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-71. PCT
ABSOLUTE HUMIDITY 12.2 GM/KG(85.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10528.)	302.1 (10670.)	307.2 (10851.)	299.1 (10563.)
HC SAMPLE METER/RANGE/PPM	16.2/22/ 16.	20.1/22/ 20.	30.1/22/ 30.	23.3/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	7.0/ 2/ 7.	6.6/ 2/ 7.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	55.5/13/ 53.	31.1/13/ 29.	26.5/13/ 24.	48.4/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.5/13/ 0.	.7/13/ 1.	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	33.3/ 3/ .55	76.7/ 3/ 1.40	23.0/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.6/14/ 146.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 3/ 1.	.5/ 2/ 1.
DILUTION FACTOR	35.78	23.94	9.53	35.29
HC CONCENTRATION PPM	9.	13.	24.	17.
CO CONCENTRATION PPM	51.	27.	23.	44.
CO2 CONCENTRATION PCT	.33	.51	1.36	.33
NOX CONCENTRATION PPM	25.5	45.1	145.1	26.7
HC MASS GRAMS	1.62	2.33	4.28	3.01
CO MASS GRAMS	17.57	9.58	8.05	15.24
CO2 MASS GRAMS	1780.4	2842.9	7630.4	1814.8
NOX MASS GRAMS	14.54	26.08	85.26	15.26
FUEL KG (LB)	.566 (1.25)	.894 (1.97)	2.389 (5.27)	.577 (1.27)
KW HR (HP HR)	1.80 (2.41)	3.06 (4.10)	9.58 (12.84)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	.90 (.67)	.76 (.57)	.45 (.33)	1.68 (1.25)
BSCO G/KW HR (G/HP HR)	9.78 (7.30)	3.14 (2.34)	.84 (.63)	8.49 (6.33)
BSCO2 G/KW HR (G/HP HR)	991.50 (739.36)	930.55 (693.91)	796.75 (594.14)	1010.67 (753.66)
BSNOX G/KW HR (G/HP HR)	8.09 (6.04)	8.54 (6.36)	8.90 (6.64)	8.50 (6.34)
BSFC KG/KW HR (LB/HP HR)	.315 (.518)	.293 (.481)	.249 (.410)	.321 (.528)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	.69 (.52)
BSCO G/KW HR (G/HP HR)	3.11 (2.32)
BSCO2 G/KW HR (G/HP HR)	867. (647.)
BSNOX G/KW HR (G/HP HR)	8.70 (6.49)
BSFC KG/KW HR (LB/HP HR)	.273 (.448)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.950 (33.57)
MULTIPLIER FOR	G/TEST	1.269
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0782 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2869 (.1301)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.030-1 RUN3
DATE 7/28/81
TIME 11:04
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-70. PCT
ABSOLUTE HUMIDITY 12.4 GM/KG(86.7 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10530.)	302.2 (10675.)	307.3 (10853.)	299.1 (10566.)
HC SAMPLE METER/RANGE/PPM	15.8/22/ 16.	20.3/22/ 20.	30.5/22/ 31.	23.4/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.0/ 2/ 6.	5.9/ 2/ 6.	5.8/ 2/ 6.	5.5/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	55.8/13/ 53.	31.5/13/ 29.	27.3/13/ 25.	48.0/13/ 45.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.5/13/ 0.	.7/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.5/ 3/ .36	32.6/ 3/ .54	76.3/ 3/ 1.39	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.7/ 3/ .04	3.0/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.7/14/ 27.	4.6/14/ 46.	14.7/14/ 147.	2.8/14/ 28.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	36.11	24.49	9.58	36.45
HC CONCENTRATION PPM	10.	15.	25.	18.
CO CONCENTRATION PPM	51.	28.	23.	43.
CO2 CONCENTRATION PCT	.32	.50	1.35	.32
NOX CONCENTRATION PPM	26.4	45.6	146.2	27.4
HC MASS GRAMS	1.72	2.54	4.49	3.12
CO MASS GRAMS	17.68	9.72	8.31	15.03
CO2 MASS GRAMS	1753.8	2782.1	7608.9	1765.5
NOX MASS GRAMS	15.04	26.36	85.96	15.70
FUEL KG (LB)	.558 (1.23)	.875 (1.93)	2.383 (5.25)	.561 (1.24)
KW HR (HP HR)	1.80 (2.41)	3.06 (4.10)	9.55 (12.81)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.96 (.71)	.83 (.62)	.47 (.35)	1.75 (1.30)
BSCO G/KW HR (G/HP HR)	9.85 (7.34)	3.18 (2.37)	.87 (.65)	8.43 (6.28)
BSCO2 G/KW HR (G/HP HR)	976.66 (728.29)	910.62 (679.05)	796.58 (594.01)	990.05 (738.28)
BSNOX G/KW HR (G/HP HR)	8.37 (6.24)	8.63 (6.43)	9.00 (6.71)	8.81 (6.57)
BSFC KG/KW HR (LB/HP HR)	.311 (.510)	.287 (.471)	.249 (.410)	.315 (.517)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.19 (21.71)
BSHC G/KW HR (G/HP HR)	.73 (.55)
BSCO G/KW HR (G/HP HR)	3.14 (2.34)
BSCO2 G/KW HR (G/HP HR)	859. (641.)
BSNOX G/KW HR (G/HP HR)	8.84 (6.59)
BSFC KG/KW HR (LB/HP HR)	.270 (.445)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.951 (33.57)
MULTIPLIER FOR	G/TEST	1.270
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0784 (.0585)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2901 (.1316)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN4
DATE 7/28/81
TIME 11:44
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-63. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(83.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6382.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10533.)	302.2 (10674.)	307.4 (10857.)	299.2 (10567.)
HC SAMPLE METER/RANGE/PPM	14.8/22/ 15.	19.0/22/ 19.	20.9/22/ 29.	22.1/22/ 22.
HC BCKGRD METER/RANGE/PPM	6.7/ 2/ 7.	6.6/ 2/ 7.	6.1/ 2/ 6.	5.0/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	53.3/13/ 51.	31.5/13/ 29.	27.2/13/ 25.	51.0/13/ 48.
CO BCKGRD METER/RANGE/PPM	1.0/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.5/ 3/ .36	32.2/ 3/ .54	76.1/ 3/ 1.39	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.9/ 3/ .04	3.3/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.5/14/ 45.	14.4/14/ 144.	2.6/14/ 26.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.4/ 3/ 1.	.6/ 2/ 1.
DILUTION FACTOR	36.14	24.83	9.61	35.93
HC CONCENTRATION PPM	8.	13.	23.	17.
CO CONCENTRATION PPM	48.	27.	23.	46.
CO2 CONCENTRATION PCT	.33	.49	1.34	.32
NOX CONCENTRATION PPM	25.4	44.7	142.9	25.1
HC MASS GRAMS	1.42	2.21	4.16	2.97
CO MASS GRAMS	16.77	9.63	8.16	15.97
CO2 MASS GRAMS	1778.9	2725.6	7564.6	1769.4
NOX MASS GRAMS	14.49	25.86	84.04	14.37
FUEL KG (LB)	.565 (1.24)	.857 (1.89)	2.368 (5.22)	.563 (1.24)
KW HR (HP HR)	1.81 (2.42)	3.04 (4.08)	9.54 (12.79)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.79 (.59)	.73 (.54)	.44 (.33)	1.66 (1.24)
BSCO G/KW HR (G/HP HR)	9.28 (6.92)	3.16 (2.36)	.86 (.64)	8.96 (6.68)
BSCO2 G/KW HR (G/HP HR)	983.81 (733.63)	895.81 (668.01)	792.98 (591.33)	792.28 (739.94)
BSNOX G/KW HR (G/HP HR)	8.01 (5.97)	8.50 (6.34)	8.81 (6.57)	8.06 (6.01)
BSFC KG/KW HR (LB/HP HR)	.312 (.513)	.282 (.463)	.248 (.408)	.316 (.519)

TOTAL TES* RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.17 (21.69)
BSHC G/KW HR (G/HP HR)	.67 (.50)
BSCO G/KW HR (G/HP HR)	3.12 (2.33)
BSCO2 G/KW HR (G/HP HR)	856. (638.)
BSNOX G/KW HR (G/HP HR)	8.58 (6.40)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.967 (34.16)
MULTIPLIER FOR	G/TEST	1.248
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0575)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2867 (.1301)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUNS
DATE 7/28/81
TIME 12:24
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-67. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 11.9 GM/KG(83.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10533.)	302.3 (10675.)	307.3 (10854.)	299.2 (10567.)
HC SAMPLE METER/RANGE/PPM	14.7/22/ 15.	19.2/22/ 19.	29.7/22/ 30.	22.6/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.5/ 2/ 7.	6.7/ 2/ 7.	5.6/ 2/ 6.	5.5/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	57.2/13/ 55.	32.9/13/ 30.	23.4/13/ 21.	49.1/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.1/13/ 1.	.1/13/ 0.	.1/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	33.2/ 3/ .55	76.1/ 3/ 1.39	22.5/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.5/ 3/ .04	3.1/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.6/14/ 146.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 3/ 1.	.9/ 2/ 1.
DILUTION FACTOR	36.27	24.02	9.61	36.11
HC CONCENTRATION PPM	8.	13.	25.	17.
CO CONCENTRATION PPM	53.	29.	20.	45.
CO2 CONCENTRATION PCT	.33	.52	1.35	.33
NOX CONCENTRATION PPM	25.5	45.1	144.8	26.3
HC MASS GRAMS	1.44	2.23	4.37	2.98
CO MASS GRAMS	18.25	10.04	7.27	15.68
CO2 MASS GRAMS	1777.5	2858.8	7578.5	1784.5
NOX MASS GRAMS	14.54	26.09	85.13	15.04
FUEL KG (LB)	.565 (1.25)	.899 (1.98)	2.372 (5.23)	.567 (1.25)
KW HR (HP HR)	1.78 (2.39)	3.06 (4.10)	9.50 (12.74)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	.81 (.60)	.73 (.54)	.46 (.34)	1.66 (1.24)
BSCO G/KW HR (G/HP HR)	10.24 (7.63)	3.29 (2.45)	.77 (.57)	8.73 (6.51)
BSCO2 G/KW HR (G/HP HR)	996.82 (743.33)	935.73 (697.77)	797.56 (594.74)	993.78 (741.06)
BSNOX G/KW HR (G/HP HR)	8.15 (6.08)	8.54 (6.37)	8.96 (6.68)	8.37 (6.24)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.294 (.484)	.250 (.410)	.316 (.519)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.14 (21.64)
BSHC G/KW HR (G/HP HR)	.68 (.51)
BSCO G/KW HR (G/HP HR)	3.18 (2.37)
BSCO2 G/KW HR (G/HP HR)	868. (647.)
BSNOX G/KW HR (G/HP HR)	8.73 (6.51)
BSFC KG/KW HR (LB/HP HR)	.273 (.449)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.944 (33.33)
MULTIPLIER FOR	G/TEST	1.279
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0793 (.0591)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2904 (.1317)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN6
DATE 7/28/81
TIME 1:08
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-56. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.7 GM/KG(82.2 GRAINS/LB)　　NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10535.)	302.3 (10678.)	307.4 (10858.)	299.3 (10571.)
HC SAMPLE METER/RANGE/PPM	14.8/22/ 15.	19.2/22/ 19.	29.4/22/ 29.	22.6/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.0/ 2/ 6.	6.3/ 2/ 6.	5.7/ 2/ 6.	5.4/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	56.8/13/ 54.	30.7/13/ 28.	24.1/13/ 22.	47.0/13/ 44.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.2/13/ 0.	.3/13/ 0.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	32.7/ 3/ .54	74.6/ 3/ 1.36	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	3.3/ 3/ .05	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.5/14/ 145.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.7/ 2/ 1.	.5/ 3/ 2.	1.0/ 2/ 1.
DILUTION FACTOR	36.28	24.42	9.83	35.96
HC CONCENTRATION PPM	9.	13.	24.	17.
CO CONCENTRATION PPM	52.	27.	21.	42.
CO2 CONCENTRATION PCT	.32	.50	1.31	.32
NOX CONCENTRATION PPM	25.3	44.9	144.1	25.7
HC MASS GRAMS	1.55	2.30	4.31	3.00
CO MASS GRAMS	18.22	9.59	7.44	14.77
CO2 MASS GRAMS	1761.6	2784.8	7391.6	1737.1
NOX MASS GRAMS	14.43	25.98	84.73	14.71
FUEL KG (LB)	.560 (1.23)	.876 (1.93)	2.314 (5.10)	.552 (1.22)
KW HR (HP HR)	1.80 (2.41)	3.09 (4.15)	9.55 (12.81)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.86 (.64)	.74 (.56)	.45 (.34)	1.68 (1.26)
BSCO G/KW HR (G/HP HR)	10.15 (7.57)	3.10 (2.31)	.78 (.58)	8.28 (6.18)
BSCO2 G/KW HR (G/HP HR)	981.02 (731.54)	700.49 (671.49)	773.83 (577.05)	974.14 (726.42)
BSNOX G/KW HR (G/HP HR)	8.04 (5.99)	8.40 (6.27)	8.87 (6.61)	8.25 (6.15)
BSFC KG/KW HR (LB/HP HR)	.312 (.513)	.283 (.466)	.242 (.398)	.310 (.509)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	.69 (.51)
BSCO G/KW HR (G/HP HR)	3.08 (2.30)
BSCO2 G/KW HR (G/HP HR)	843. (629.)
BSNOX G/KW HR (G/HP HR)	8.62 (6.43)
BSFC KG/KW HR (LB/HP HR)	.265 (.436)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.950 (33.54)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0784 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2955 (.1341)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN1
DATE 7/29/81
TIME 9:49
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-70. PCT , CVS-40. PCT
ABSOLUTE HUMIDITY 12.9 GM/KG(90.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10527.)	302.1 (10669.)	307.2 (10849.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	37.6/22/ 38.	25.6/22/ 26.	44.7/22/ 45.	23.2/22/ 23.
HC BCKGRD METER/RANGE/PPM	9.0/ 2/ 9.	8.0/ 2/ 8.	8.2/ 2/ 8.	8.3/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	36.1/13/ 33.	22.6/13/ 21.	26.6/13/ 24.	46.8/13/ 44.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.2/13/ 0.	.5/13/ 0.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.5/ 3/ .42	34.2/ 3/ .57	77.1/ 3/ 1.41	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.9/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.0/14/ 20.	3.7/14/ 37.	14.1/14/ 141.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.5/ 2/ 1.	.0/13/ 0.	.8/ 2/ 1.
DILUTION FACTOR	31.65	23.27	9.46	36.46
HC CONCENTRATION PPM	29.	18.	37.	15.
CO CONCENTRATION PPM	32.	20.	23.	42.
CO2 CONCENTRATION PCT	.37	.53	1.36	.32
NOX CONCENTRATION PPM	19.5	36.5	141.1	25.9
HC MASS GRAMS	4.97	3.13	6.61	2.60
CO MASS GRAMS	11.24	7.00	8.20	14.72
CO2 MASS GRAMS	2013.4	2924.7	7675.7	1748.3
NOX MASS GRAMS	11.10	21.08	82.92	14.81
FUEL KG (LB)	.639 (1.41)	.919 (2.03)	2.405 (5.30)	.555 (1.22)
KW HR (HP HR)	1.66 (2.22)	2.87 (3.85)	9.56 (12.83)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	2.99 (2.23)	1.09 (.81)	.69 (.52)	1.46 (1.09)
BSCO G/KW HR (G/HP HR)	6.78 (5.05)	2.44 (1.82)	.86 (.64)	8.26 (6.16)
BSCO2 G/KW HR (G/HP HR)	1214.01 (905.28)	1019.76 (760.43)	802.52 (598.44)	980.45 (731.12)
BSNOX G/KW HR (G/HP HR)	6.69 (4.99)	7.35 (5.48)	8.67 (6.46)	8.30 (6.19)
BSFC KG/KW HR (LB/HP HR)	.385 (.633)	.320 (.527)	.251 (.413)	.311 (.512)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	15.87 (21.29)
BSHC G/KW HR (G/HP HR)	1.09 (.81)
BSCO G/KW HR (G/HP HR)	2.59 (1.93)
BSCO2 G/KW HR (G/HP HR)	905. (675.)
BSNOX G/KW HR (G/HP HR)	8.18 (6.10)
BSFC KG/KW HR (LB/HP HR)	.285 (.468)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.996 (35.17)
MULTIPLIER FOR	G/TEST	1.211
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0763 (.0569)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2681 (.1216)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS- INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN1
DATE 7/29/81
TIME 10:30
DYNO NO. 5

DIESEL EM 465 F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-48. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.9 (10523.)	302.0 (10667.)	307.1 (10846.)	298.9 (10558.)
HC SAMPLE METER/RANGE/PPM	21.3/22/ 21.	26.2/22/ 26.	44.3/22/ 44.	24.3/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	8.0/ 2/ 8.	7.8/ 2/ 8.	7.6/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	55.8/13/ 53.	32.1/13/ 30.	26.6/13/ 24.	48.3/13/ 45.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.9/13/ 1.	.9/13/ 1.	1.3/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	32.8/ 3/ .55	75.9/ 3/ 1.30	22.9/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.6/ 3/ .04	2.9/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.7/14/ 147.	2.8/14/ 28.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.3/ 3/ 1.	.8/ 2/ 1.
DILUTION FACTOR	35.72	24.30	9.63	35.44
HC CONCENTRATION PPM	14.	19.	37.	17.
CO CONCENTRATION PPM	51.	28.	23.	43.
CO2 CONCENTRATION PCT	.33	.51	1.35	.33
NOX CONCENTRATION PPM	25.8	45.0	146.0	26.9
HC MASS GRAMS	2.37	3.23	6.61	2.91
CO MASS GRAMS	17.77	9.86	8.09	15.08
CO2 MASS GRAMS	1787.7	2808.3	7564.9	1788.1
NOX MASS GRAMS	14.69	26.01	85.78	15.36
FUEL KG (LB)	.569 (1.25)	.884 (1.95)	2.371 (5.23)	.568 (1.25)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.50 (12.74)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.32 (.98)	1.07 (.79)	.70 (.52)	1.63 (1.22)
BSCO G/KW HR (G/HP HR)	9.90 (7.38)	3.26 (2.43)	.85 (.63)	8.46 (6.31)
BSCO2 G/KW HR (G/HP HR)	995.59 (742.41)	926.78 (691.10)	796.14 (593.68)	1002.74 (747.74)
BSNOX G/KW HR (G/HP HR)	8.18 (6.10)	8.58 (6.40)	9.03 (6.73)	8.61 (6.42)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.292 (.480)	.250 (.410)	.319 (.524)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.11 (21.61)
BSHC G/KW HR (G/HP HR)	.94 (.70)
BSCO G/KW HR (G/HP HR)	3.15 (2.35)
BSCO2 G/KW HR (G/HP HR)	866. (646.)
BSNOX G/KW HR (G/HP HR)	8.80 (6.57)
BSFC KG/KW HR (LB/HP HR)	.273 (.448)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.970 (34.26)
MULTIPLIER FOR	G/TEST	1.243
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0575)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2830 (.1284)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-2 RUN2
DATE 7/29/81
TIME 11:10
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(81.0 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6212.	6275.	6381.	6212.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.9 (10558.)	302.0 (10665.)	307.1 (10845.)	298.9 (10558.)
HC SAMPLE METER/RANGE/PPM	20.6/22/ 21.	25.2/22/ 25.	44.3/22/ 44.	24.3/22/ 24.
HC BCKGRD METER/RANGE/PPM	8.7/ 2/ 9.	8.8/ 2/ 9.	8.5/ 2/ 9.	8.5/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	51.4/13/ 49.	31.0/13/ 29.	27.6/13/ 25.	49.7/13/ 47.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	21.8/ 3/ .35	33.3/ 3/ .55	77.0/ 3/ 1.41	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.7/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.5/14/ 25.	4.5/14/ 45.	14.6/14/ 146.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	37.31	23.92	9.47	36.42
HC CONCENTRATION PPM	12.	17.	37.	16.
CO CONCENTRATION PPM	47.	27.	23.	45.
CO2 CONCENTRATION PCT	.32	.52	1.37	.32
NOX CONCENTRATION PPM	24.8	44.5	145.3	26.0
HC MASS GRAMS	2.09	2.92	6.51	2.76
CO MASS GRAMS	16.31	9.47	8.30	15.57
CO2 MASS GRAMS	1733.5	2849.7	7715.9	1756.0
NOX MASS GRAMS	14.19	25.73	85.34	14.86
FUEL KG (LB)	.551 (1.21)	.897 (1.98)	2.418 (5.33)	.558 (1.23)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.50 (12.74)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.17 (.87)	.96 (.72)	.68 (.51)	1.56 (1.16)
BSCO G/KW HR (G/HP HR)	9.08 (6.77)	3.13 (2.33)	.87 (.65)	8.80 (6.56)
BSCO2 G/KW HR (G/HP HR)	965.38 (719.88)	940.44 (701.29)	812.03 (605.53)	991.68 (739.49)
BSNOX G/KW HR (G/HP HR)	7.90 (5.89)	8.49 (6.33)	8.98 (6.70)	8.39 (6.26)
BSFC KG/KW HR (LB/HP HR)	.307 (.504)	.296 (.486)	.254 (.418)	.315 (.518)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.10 (21.59)
BSHC G/KW HR (G/HP HR)	.89 (.66)
BSCO G/KW HR (G/HP HR)	3.08 (2.30)
BSCO2 G/KW HR (G/HP HR)	873. (651.)
BSNOX G/KW HR (G/HP HR)	8.70 (6.49)
BSFC KG/KW HR (LB/HP HR)	.275 (.452)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.941 (33.22)
MULTIPLIER FOR	G/TEST	1.283
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0797 (.0594)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2900 (.1316)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN3
DATE 7/29/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE 62. PCT , CVS 62. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.7 (10516.)	301.8 (10659.)	306.9 (10839.)	298.8 (10552.)
HC SAMPLE METER/RANGE/PPM	20.2/22/ 20.	25.5/22/ 25.	44.7/22/ 45.	24.6/22/ 25.
HC BCKGRD METER/RANGE/PPM	7.1/ 2/ 7.	7.2/ 2/ 7.	7.2/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	55.4/13/ 53.	32.7/13/ 30.	26.8/13/ 25.	48.9/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.0/13/ 1.	.9/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	33.1/ 3/ .55	75.2/ 3/ 1.37	22.1/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.6/ 3/ .04	2.9/ 3/ .04	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	2.7/14/ 27.	4.7/14/ 47.	14.9/14/ 149.	2.8/14/ 28.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.6/ 3/ 2.	.9/ 2/ 1.
DILUTION FACTOR	36.24	24.07	9.73	36.77
HC CONCENTRATION PPM	13.	19.	38.	18.
CO CONCENTRATION PPM	51.	28.	23.	44.
CO2 CONCENTRATION PCT	.32	.51	1.33	.31
NOX CONCENTRATION PPM	26.3	46.0	147.1	27.2
HC MASS GRAMS	2.29	3.24	6.77	3.07
CO MASS GRAMS	17.57	9.98	8.11	15.33
CO2 MASS GRAMS	1758.5	2036.2	7479.3	1703.3
NOX MASS GRAMS	14.96	26.55	86.36	15.57
FUEL KG (LB)	.560 (1.23)	.893 (1.97)	2.344 (5.17)	.542 (1.19)
KW HR (HP HR)	1.81 (2.42)	3.04 (4.08)	9.50 (12.74)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.27 (.94)	1.06 (.79)	.71 (.53)	1.73 (1.29)
BSCO G/KW HR (G/HP HR)	9.72 (7.25)	3.28 (2.44)	.85 (.64)	8.66 (6.45)
BSCO2 G/KW HR (G/HP HR)	972.53 (725.21)	932.16 (695.11)	787.12 (586.96)	961.92 (717.31)
BSNOX G/KW HR (G/HP HR)	8.28 (6.17)	8.72 (6.51)	9.09 (6.78)	8.79 (6.56)
BSFC KG/KW HR (LB/HP HR)	.309 (.509)	.294 (.483)	.247 (.406)	.306 (.503)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.12 (21.62)
BSHC G/KW HR (G/HP HR)	.95 (.71)
BSCO G/KW HR (G/HP HR)	3.16 (2.36)
BSCO2 G/KW HR (G/HP HR)	854. (637.)
BSNOX G/KW HR (G/HP HR)	8.90 (6.63)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.949 (33.50)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0788 (.0588)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2928 (.1328)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN4
DATE 7/29/81
TIME 12:40
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-61. PCT , CVS-56. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(84.0 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	297.7 (10515.)	301.7 (10658.)	306.8 (10838.)	298.7 (10551.)
HC SAMPLE METER/RANGE/PPM	20.8/22/ 21.	25.9/22/ 26.	44.9/22/ 45.	24.5/22/ 25.
HC BCKGRD METER/RANGE/PPM	7.2/ 2/ 7.	7.3/ 2/ 7.	6.8/ 2/ 7.	6.7/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	54.6/13/ 52.	31.8/13/ 29.	25.7/13/ 24.	52.1/13/ 49.
CO BCKGRD METER/RANGE/PPM	.2/13/ 0.	.2/13/ 0.	.5/13/ 0.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.0/ 3/ .36	33.0/ 3/ .55	76.0/ 3/ 1.39	23.3/ 3/ .38
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.9/ 3/ .04	3.3/ 3/ .05	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	2.7/14/ 27.	4.6/14/ 46.	14.8/14/ 148.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.8/ 2/ 1.	.4/ 3/ 1.	1.0/ 2/ 1.
DILUTION FACTOR	36.93	24.15	9.61	34.77
HC CONCENTRATION PPM	14.	19.	39.	18.
CO CONCENTRATION PPM	50.	28.	22.	47.
CO2 CONCENTRATION PCT	.31	.51	1.34	.33
NOX CONCENTRATION PPM	26.2	45.3	146.7	26.2
HC MASS GRAMS	2.36	3.28	6.88	3.11
CO MASS GRAMS	17.47	9.94	7.88	16.51
CO2 MASS GRAMS	1712.5	2801.3	7539.9	1800.0
NOX MASS GRAMS	14.91	26.16	86.11	14.97
FUEL KG (LB)	.545 (1.20)	.882 (1.94)	2.363 (5.21)	.573 (1.26)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.53 (12.78)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.32 (.98)	1.08 (.81)	.72 (.54)	1.74 (1.30)
BSCO G/KW HR (G/HP HR)	9.73 (7.26)	3.28 (2.45)	.83 (.62)	9.26 (6.90)
BSCO2 G/KW HR (G/HP HR)	953.68 (711.16)	924.48 (689.38)	791.43 (590.17)	1009.45 (752.75)
BSNOX G/KW HR (G/HP HR)	8.30 (6.19)	8.63 (6.44)	9.04 (6.74)	8.39 (6.26)
BSFC KG/KW HR (LB/HP HR)	.304 (.499)	.291 (.479)	.248 (.408)	.321 (.528)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.14 (21.64)
BSHC G/KW HR (G/HP HR)	.97 (.72)
BSCO G/KW HR (G/HP HR)	3.21 (2.39)
BSCO2 G/KW HR (G/HP HR)	859. (640.)
BSNOX G/KW HR (G/HP HR)	8.81 (6.57)
BSFC KG/KW HR (LB/HP HR)	.270 (.445)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.950 (33.55)
MULTIPLIER FOR	G/TEST	1.269
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0786 (.0586)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2907 (.1319)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NOx
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN5
DATE 7/29/81
TIME 1:20
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.20 MM HG(29.26 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-65. PCT , CVS 52. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(80.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.6 (10510.)	301.6 (10652.)	306.7 (10833.)	298.6 (10546.)
HC SAMPLE METER/RANGE/PPM	19.9/22/ 20.	25.0/22/ 25.	44.9/22/ 45.	23.8/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	7.8/ 2/ 8.	7.2/ 2/ 7.	6.7/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	53.5/13/ 51.	32.1/13/ 30.	27.0/13/ 25.	50.9/13/ 48.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.6/13/ 1.	.6/13/ 1.	.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	33.2/ 3/ .55	77.1/ 3/ 1.41	22.8/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.6/ 3/ .04	3.0/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.7/14/ 27.	4.7/14/ 47.	15.1/14/ 151.	2.8/14/ 28.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	35.76	24.00	9.46	35.58
HC CONCENTRATION PPM	12.	18.	38.	17.
CO CONCENTRATION PPM	49.	28.	23.	46.
CO2 CONCENTRATION PCT	.33	.51	1.37	.33
NOX CONCENTRATION PPM	26.7	46.5	149.5	27.4
HC MASS GRAMS	2.13	3.05	6.80	2.98
CO MASS GRAMS	16.95	9.92	8.28	16.14
CO2 MASS GRAMS	1777.4	2844.5	7687.4	1792.9
NOX MASS GRAMS	15.18	26.81	87.73	15.67
FUEL KG (LB)	.565 (1.25)	.895 (1.97)	2.409 (5.31)	.570 (1.26)
KW HR (HP HR)	1.78 (2.39)	3.03 (4.06)	9.53 (12.78)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.19 (.89)	1.01 (.75)	.71 (.53)	1.67 (1.25)
BSCO G/KW HR (G/HP HR)	9.51 (7.09)	3.27 (2.44)	.87 (.65)	9.05 (6.75)
BSCO2 G/KW HR (G/HP HR)	996.75 (743.28)	938.71 (700.00)	806.91 (601.71)	1005.43 (749.75)
BSNOX G/KW HR (G/HP HR)	8.51 (6.35)	8.85 (6.60)	9.21 (6.87)	8.79 (6.55)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.295 (.486)	.253 (.416)	.320 (.526)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.12 (21.62)
BSHC G/KW HR (G/HP HR)	.93 (.69)
BSCO G/KW HR (G/HP HR)	3.18 (2.37)
BSCO2 G/KW HR (G/HP HR)	875. (652.)
BSNOX G/KW HR (G/HP HR)	9.02 (6.72)
BSFC KG/KW HR (LB/HP HR)	.275 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.939 (33.18)
MULTIPLIER FOR	G/TEST	1.282
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0795 (.0593)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2888 (.1310)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NOx
H-TRANS.

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN6
DATE 7/29/81
TIME 2:00
DYNO NO. 5

PROJECT NO. 05 6570-001

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.19 MM HG(29.22 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-56. PCT , CVS-49. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6380.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.1 (10495.)	301.1 (10636.)	306.2 (10814.)	298.1 (10529.)
HC SAMPLE METER/RANGE/PPM	19.5/22/ 20.	24.7/22/ 25.	44.5/22/ 45.	23.2/22/ 23.
HC BCKGRD METER/RANGE/PPM	5.5/ 2/ 6.	5.5/ 2/ 6.	5.0/ 2/ 6.	5.3/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	56.3/13/ 54.	33.9/13/ 31.	26.7/13/ 24.	48.4/13/ 46.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.0/13/ 1.	.9/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.8/ 3/ .37	33.3/ 3/ .55	75.0/ 3/ 1.37	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.7/ 3/ .04	3.2/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.6/14/ 26.	4.6/14/ 46.	14.8/14/ 148.	2.7/14/ 27.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	35.57	23.91	9.76	36.44
HC CONCENTRATION PPM	14.	19.	39.	18.
CO CONCENTRATION PPM	51.	30.	23.	44.
CO2 CONCENTRATION PCT	.33	.52	1.32	.32
NOX CONCENTRATION PPM	25.8	45.5	147.2	26.5
HC MASS GRAMS	2.43	3.38	6.94	3.11
CO MASS GRAMS	17.77	10.39	8.10	15.19
CO2 MASS GRAMS	1008.8	2841.9	7415.3	1734.8
NOX MASS GRAMS	14.66	26.21	86.20	15.10
FUEL KG (LB)	.575 (1.27)	.895 (1.97)	2.324 (5.12)	.552 (1.22)
KW HR (HP HR)	1.78 (2.39)	3.04 (4.08)	9.51 (12.76)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.36 (1.02)	1.11 (.83)	.73 (.54)	1.75 (1.31)
BSCO G/KW HR (G/HP HR)	9.97 (7.43)	3.41 (2.55)	.85 (.63)	8.58 (6.40)
BSCO2 G/KW HR (G/HP HR)	1014.35 (756.40)	934.02 (696.50)	779.37 (581.10)	979.71 (730.57)
BSNOX G/KW HR (G/HP HR)	8.22 (6.13)	8.62 (6.42)	9.06 (6.76)	8.52 (6.36)
BSFC KG/KW HR (LB/HP HR)	.323 (.531)	.294 (.484)	.244 (.402)	.312 (.512)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.11 (21.61)
BSHC G/KW HR (G/HP HR)	.98 (.73)
BSCO G/KW HR (G/HP HR)	3.19 (2.38)
BSCO2 G/KW HR (G/HP HR)	857. (639.)
BSNOX G/KW HR (G/HP HR)	8.82 (6.58)
BSFC KG/KW HR (LB/HP HR)	.270 (.444)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.942 (33.26)
MULTIPLIER FOR	G/TEST	1.277
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0793 (.0591)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2930 (.1333)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NOx
C-TRANS.

PROJECT NO. 05 6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN1
DATE 7/28/81
TIME 9:00
DYNO NO. 5

DIESEL EM 465 F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 22.2 DEG C(72.0 DEG F)

RELATIVE HUMIDITY , ENGINE 61. PCT , CVS 73. PCT
ABSOLUTE HUMIDITY 10.5 GM/KG(73.2 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)	365.8 (14.4)
BLOWER INLET P MM. H2O(IN. H2O)	185.4 (7.3)	185.4 (7.3)	185.4 (7.3)	185.4 (7.3)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6276.	6381.	6213.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.0 (10525.)	302.0 (10668.)	307.1 (10847.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	21.3/22/ 21.	29.8/22/ 30.	23.4/22/ 23.
HC BCKGRD METER/RANGE/PPM	5.5/ 2/ 6.	5.3/ 2/ 5.	5.9/ 2/ 6.	5.6/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	33.4/13/ 31.	23.7/13/ 22.	27.6/13/ 25.	46.6/13/ 44.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.9/13/ 1.	.8/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.8/ 3/ .40	33.7/ 3/ .56	76.7/ 3/ 1.40	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.7/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	28.9/ 2/ 29.	43.5/ 2/ 44.	14.4/14/ 144.	35.3/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	32.69	23.66	9.52	35.96
HC CONCENTRATION PPM	23.	16.	25.	18.
CO CONCENTRATION PPM	29.	20.	23.	41.
CO2 CONCENTRATION PCT	.37	.52	1.36	.32
NOX CONCENTRATION PPM	28.6	43.2	143.3	34.9
HC MASS GRAMS	3.90	2.82	4.35	3.10
CO MASS GRAMS	10.12	7.15	8.37	14.44
CO2 MASS GRAMS	2011.5	2890.6	7666.3	1776.6
NOX MASS GRAMS	16.31	24.97	84.16	17.97
FUEL KG (LB)	.636 (1.40)	.908 (2.00)	2.400 (5.29)	.564 (1.24)
KW HR (HP HR)	1.70 (2.27)	2.89 (3.88)	9.65 (12.94)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	2.30 (1.71)	.97 (.73)	.45 (.34)	1.73 (1.29)
BSCO G/KW HR (G/HP HR)	5.97 (4.45)	2.47 (1.84)	.87 (.65)	8.04 (6.00)
BSCO2 G/KW HR (G/HP HR)	1186.07 (884.45)	999.17 (745.08)	794.30 (592.31)	989.37 (737.77)
BSNOX G/KW HR (G/HP HR)	9.62 (7.17)	8.63 (6.44)	8.72 (6.50)	11.12 (8.29)
BSFC KG/KW HR (LB/HP HR)	.375 (.617)	.314 (.516)	.249 (.409)	.314 (.517)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.04 (21.51)	
BSHC G/KW HR (G/HP HR)	.88 (.66)	
BSCO G/KW HR (G/HP HR)	2.50 (1.86)	
BSCO2 G/KW HR (G/HP HR)	895. (667.)	
BSNOX G/KW HR (G/HP HR)	9.07 (6.76)	(bag)
BSFC KG/KW HR (LB/HP HR)	.281 (.462)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	1.008 (35.59)
MULTIPLIER FOR	G/TEST	1.197
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0746 (.0557)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2654 (.1204)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN1
DATE 7/28/81
TIME 9:40
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-70. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.4 GRAINS/LB)
NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10538.)	302.3 (10677.)	307.5 (10859.)	299.3 (10572.)
HC SAMPLE METER/RANGE/PPM	16.7/22/ 17.	20.5/22/ 21.	29.9/22/ 30.	23.3/22/ 23.
HC BCKGRD METER/RANGE/PPM	7.4/ 2/ 7.	7.0/ 2/ 7.	6.7/ 2/ 7.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	53.3/13/ 51.	30.4/13/ 28.	25.7/13/ 24.	45.9/13/ 43.
CO BCKGRD METER/RANGE/PPM	.1/13/ 0.	.1/13/ 0.	.3/13/ 0.	.4/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.0/ 3/ .36	32.3/ 3/ .54	76.7/ 3/ 1.40	22.5/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	32.5/ 2/ 33.	48.2/ 2/ 48.	46.9/ 3/ 141.	34.4/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.2/ 2/ 0.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	36.98	24.74	9.53	36.13
HC CONCENTRATION PPM	10.	14.	24.	17.
CO CONCENTRATION PPM	49.	27.	22.	41.
CO2 CONCENTRATION PCT	.32	.50	1.36	.33
NOX CONCENTRATION PPM	32.2	48.0	139.6	33.7
HC MASS GRAMS	1.64	2.41	4.24	3.02
CO MASS GRAMS	17.01	9.49	7.92	14.44
CO2 MASS GRAMS	1748.9	2761.4	7683.1	1785.4
NOX MASS GRAMS	18.38	27.77	82.12	19.31
FUEL KG (LB)	.556 (1.22)	.869 (1.91)	2.405 (5.30)	.567 (1.25)
KW HR (HP HR)	1.81 (2.42)	3.08 (4.13)	9.64 (12.93)	1.81 (2.42)
BSHC G/KW HR (G/HP HR)	.91 (.68)	.78 (.58)	.44 (.33)	1.67 (1.25)
BSCO G/KW HR (G/HP HR)	9.41 (7.02)	3.08 (2.30)	.82 (.61)	7.99 (5.96)
BSCO2 G/KW HR (G/HP HR)	967.26 (721.28)	896.53 (668.54)	797.07 (594.37)	987.40 (736.30)
BSNOX G/KW HR (G/HP HR)	10.17 (7.58)	9.01 (6.72)	8.52 (6.35)	10.68 (7.96)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)	.282 (.464)	.250 (.410)	.314 (.516)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.34 (21.91)	
BSHC G/KW HR (G/HP HR)	.69 (.52)	
BSCO G/KW HR (G/HP HR)	2.99 (2.23)	
BSCO2 G/KW HR (G/HP HR)	856. (638.)	
BSNOX G/KW HR (G/HP HR)	9.03 (6.74)	(bag)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	1.045 (36.92)
MULTIPLIER FOR	G/TEST	1.155
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0707 (.0527)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2627 (.1192)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN2
DATE 7/28/81
TIME
DYNO NO. 5

DIESEL EM 465-F
BAG CART NO. 1

BAROMETER 744.22 MM HG(29.30 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-71. PCT
ABSOLUTE HUMIDITY 12.2 GM/KG(85.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10528.)	302.1 (10670.)	307.2 (10851.)	299.1 (10563.)
HC SAMPLE METER/RANGE/PPM	16.2/22/ 16.	20.1/22/ 20.	30.1/22/ 30.	23.3/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	7.0/ 2/ 7.	6.6/ 2/ 7.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	55.5/13/ 53.	31.1/13/ 29.	26.5/13/ 24.	48.4/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.5/13/ 0.	.7/13/ 1.	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	33.3/ 3/ .55	76.7/ 3/ 1.40	23.0/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.8/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.5/ 2/ 34.	50.2/ 2/ 50.	46.4/ 3/ 139.	35.1/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 3/ 1.	.5/ 2/ 1.
DILUTION FACTOR	35.78	23.94	9.53	35.29
HC CONCENTRATION PPM	9.	13.	24.	17.
CO CONCENTRATION PPM	51.	27.	23.	44.
CO2 CONCENTRATION PCT	.33	.51	1.36	.33
NOX CONCENTRATION PPM	33.2	49.7	138.4	34.6
HC MASS GRAMS	1.62	2.33	4.28	3.01
CO MASS GRAMS	17.57	9.58	8.05	15.24
CO2 MASS GRAMS	1780.4	2842.9	7630.4	1814.8
NOX MASS GRAMS	18.93	28.73	81.33	19.80
FUEL KG (LB)	.566 (1.25)	.894 (1.97)	2.389 (5.27)	.577 (1.27)
KW HR (HP HR)	1.80 (2.41)	3.06 (4.10)	9.58 (12.84)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	.90 (.67)	.76 (.57)	.45 (.33)	1.68 (1.25)
BSCO G/KW HR (G/HP HR)	9.78 (7.30)	3.14 (2.34)	.84 (.63)	8.49 (6.33)
BSCO2 G/KW HR (G/HP HR)	991.50 (739.36)	930.55 (693.91)	796.75 (594.14)	1010.67 (753.66)
BSNOX G/KW HR (G/HP HR)	10.54 (7.86)	9.41 (7.01)	8.49 (6.33)	11.03 (8.22)
BSFC KG/KW HR (LB/HP HR)	.315 (.518)	.293 (.481)	.249 (.410)	.321 (.528)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)	
BSHC G/KW HR (G/HP HR)	.69 (.52)	
BSCO G/KW HR (G/HP HR)	3.11 (2.32)	
BSCO2 G/KW HR (G/HP HR)	867. (647.)	
BSNOX G/KW HR (G/HP HR)	9.17 (6.84)	(bag)
BSFC KG/KW HR (LB/HP HR)	.273 (.448)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.950 (33.57)
MULTIPLIER FOR	G/TEST	1.269
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0782 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2869 (.1301)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN3
DATE 7/28/81
TIME 11:04
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-70. PCT
ABSOLUTE HUMIDITY 12.4 GM/KG(86.7 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10530.)	302.2 (10675.)	307.3 (10853.)	299.1 (10566.)
HC SAMPLE METER/RANGE/PPM	15.8/22/ 16.	20.3/22/ 20.	30.5/22/ 31.	23.4/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.0/ 2/ 6.	5.9/ 2/ 6.	5.8/ 2/ 6.	5.5/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	55.8/13/ 53.	31.5/13/ 29.	27.3/13/ 25.	48.0/13/ 45.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.5/13/ 0.	.7/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.5/ 3/ .36	32.6/ 3/ .54	76.3/ 3/ 1.39	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.7/ 3/ .04	3.0/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.1/ 2/ 33.	47.7/ 2/ 48.	46.8/ 3/ 140.	34.8/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	36.11	24.49	9.58	36.45
HC CONCENTRATION PPM	10.	15.	25.	18.
CO CONCENTRATION PPM	51.	28.	23.	43.
CO2 CONCENTRATION PCT	.32	.50	1.35	.32
NOX CONCENTRATION PPM	32.7	47.2	139.3	34.1
HC MASS GRAMS	1.72	2.54	4.49	3.12
CO MASS GRAMS	17.68	9.72	8.31	15.03
CO2 MASS GRAMS	1753.8	2782.1	7608.9	1765.5
NOX MASS GRAMS	18.66	27.30	81.90	19.52
FUEL KG (LB)	.558 (1.23)	.875 (1.93)	2.383 (5.25)	.561 (1.24)
KW HR (HP HR)	1.80 (2.41)	3.06 (4.10)	9.55 (12.81)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.96 (.71)	.83 (.62)	.47 (.35)	1.75 (1.30)
BSCO G/KW HR (G/HP HR)	9.85 (7.34)	3.18 (2.37)	.87 (.65)	8.43 (6.28)
BSCO2 G/KW HR (G/HP HR)	976.66 (728.29)	910.62 (679.05)	796.58 (594.01)	990.05 (738.28)
BSNOX G/KW HR (G/HP HR)	10.39 (7.75)	8.94 (6.66)	8.57 (6.39)	10.95 (8.16)
BSFC KG/KW HR (LB/HP HR)	.311 (.510)	.287 (.471)	.249 (.410)	.315 (.517)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.19 (21.71)
BSHC G/KW HR (G/HP HR)	.73 (.55)
BSCO G/KW HR (G/HP HR)	3.14 (2.34)
BSCO2 G/KW HR (G/HP HR)	859. (641.)
BSNOX G/KW HR (G/HP HR)	9.11 (6.79) (bag)
BSFC KG/KW HR (LB/HP HR)	.270 (.445)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.951 (33.57)
MULTIPLIER FOR	G/TEST	1.270
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0784 (.0585)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2901 (.1316)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN4
DATE 7/20/81
TIME 11:44
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.47 MM HG(29.31 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-63. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(83.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6382.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10533.)	302.2 (10674.)	307.4 (10857.)	299.2 (10567.)
HC SAMPLE METER/RANGE/PPM	14.8/22/ 15.	19.0/22/ 19.	28.9/22/ 29.	22.1/22/ 22.
HC BCKGRD METER/RANGE/PPM	6.7/ 2/ 7.	6.6/ 2/ 7.	6.1/ 2/ 6.	5.0/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	53.3/13/ 51.	31.5/13/ 29.	27.2/13/ 25.	51.0/13/ 48.
CO BCKGRD METER/RANGE/PPM	1.0/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.5/ 3/ .36	32.2/ 3/ .54	76.1/ 3/ 1.39	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.9/ 3/ .04	3.3/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.1/ 2/ 33.	47.9/ 2/ 48.	47.4/ 3/ 142.	34.4/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.4/ 3/ 1.	.6/ 2/ 1.
DILUTION FACTOR	36.14	24.83	9.61	35.93
HC CONCENTRATION PPM	8.	13.	23.	17.
CO CONCENTRATION PPM	48.	27.	23.	46.
CO2 CONCENTRATION PCT	.33	.49	1.34	.32
NOX CONCENTRATION PPM	32.7	47.5	141.1	33.8
HC MASS GRAMS	1.42	2.20	4.16	2.97
CO MASS GRAMS	16.77	9.63	8.16	15.97
CO2 MASS GRAMS	1778.9	2725.6	7564.6	1769.4
NOX MASS GRAMS	18.66	27.47	82.98	19.35
FUEL KG (LB)	.565 (1.24)	.857 (1.89)	2.368 (5.22)	.563 (1.24)
KW HR (HP HR)	1.81 (2.42)	3.04 (4.08)	9.54 (12.79)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.79 (.59)	.72 (.54)	.44 (.33)	1.66 (1.24)
BSCO G/KW HR (G/HP HR)	9.28 (6.92)	3.16 (2.36)	.86 (.64)	8.96 (6.68)
BSCO2 G/KW HR (G/HP HR)	983.81 (733.63)	895.81 (668.01)	792.98 (591.33)	992.28 (739.94)
BSNOX G/KW HR (G/HP HR)	10.32 (7.70)	9.03 (6.73)	8.70 (6.49)	10.85 (8.09)
BSFC KG/KW HR (LB/HP HR)	.312 (.513)	.282 (.463)	.248 (.408)	.316 (.519)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.17 (21.69)	
BSHC G/KW HR (G/HP HR)	.66 (.50)	
BSCO G/KW HR (G/HP HR)	3.12 (2.33)	
BSCO2 G/KW HR (G/HP HR)	856. (638.)	
BSNOX G/KW HR (G/HP HR)	9.18 (6.85)	(bag)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.967 (34.16)
MULTIPLIER FOR	G/TEST	1.248
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0575)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2867 (.1301)

20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN5
DATE 7/28/81
TIME 12:24
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-67. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 11.9 GM/KG(83.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.2 (10533.)	302.3 (10675.)	307.3 (10854.)	299.2 (10567.)
HC SAMPLE METER/RANGE/PPM	14.7/22/ 15.	19.2/22/ 19.	29.7/22/ 30.	22.6/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.5/ 2/ 7.	6.7/ 2/ 7.	5.6/ 2/ 6.	5.5/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	57.2/13/ 55.	32.9/13/ 30.	23.4/13/ 21.	49.1/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.1/13/ 1.	.1/13/ 0.	.1/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	33.2/ 3/ .55	76.1/ 3/ 1.39	22.5/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.5/ 3/ .04	3.1/ 3/ .05	2.6/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	32.4/ 2/ 32.	49.1/ 2/ 49.	46.5/ 3/ 140.	35.1/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 3/ 1.	.9/ 2/ 1.
DILUTION FACTOR	36.27	24.02	9.61	36.11
HC CONCENTRATION PPM	8.	13.	25.	17.
CO CONCENTRATION PPM	53.	29.	20.	45.
CO2 CONCENTRATION PCT	.33	.52	1.35	.33
NOX CONCENTRATION PPM	32.1	48.6	138.4	34.2
HC MASS GRAMS	1.44	2.23	4.37	2.98
CO MASS GRAMS	18.25	10.04	7.27	15.68
CO2 MASS GRAMS	1777.5	2858.8	7578.5	1784.5
NOX MASS GRAMS	18.32	28.11	81.37	19.59
FUEL KG (LB)	.565 (1.25)	.899 (1.98)	2.372 (5.23)	.567 (1.25)
KW HR (HP HR)	1.78 (2.39)	3.06 (4.10)	9.50 (12.74)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	.81 (.60)	.73 (.54)	.46 (.34)	1.66 (1.24)
BSCO G/KW HR (G/HP HR)	10.24 (7.63)	3.29 (2.45)	.77 (.57)	8.73 (6.51)
BSCO2 G/KW HR (G/HP HR)	996.82 (743.33)	935.73 (697.77)	797.56 (594.74)	993.78 (741.06)
BSNOX G/KW HR (G/HP HR)	10.27 (7.66)	9.20 (6.86)	8.56 (6.39)	10.91 (8.13)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.294 (.484)	.250 (.410)	.316 (.519)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.14 (21.64)	
BSHC G/KW HR (G/HP HR)	.68 (.51)	
BSCO G/KW HR (G/HP HR)	3.18 (2.37)	
BSCO2 G/KW HR (G/HP HR)	868. (647.)	
BSNOX G/KW HR (G/HP HR)	9.13 (6.81)	(bag)
BSFC KG/KW HR (LB/HP HR)	.273 (.449)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.944 (33.33)
MULTIPLIER FOR	G/TEST	1.279
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0793 (.0591)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2904 (.1317)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-1 RUN6
DATE 7/28/81
TIME 1:08
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 744.73 MM HG(29.32 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-56. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.7 GM/KG(82.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.3 (10535.)	302.3 (10678.)	307.4 (10858.)	299.3 (10571.)
HC SAMPLE METER/RANGE/PPM	14.8/22/ 15.	19.2/22/ 19.	29.4/22/ 29.	22.6/22/ 23.
HC BCKGRD METER/RANGE/PPM	6.0/ 2/ 6.	6.3/ 2/ 6.	5.7/ 2/ 6.	5.4/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	56.8/13/ 54.	30.7/13/ 28.	24.1/13/ 22.	47.0/13/ 44.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.2/13/ 0.	.3/13/ 0.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	32.7/ 3/ .54	74.6/ 3/ 1.36	22.6/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	3.3/ 3/ .05	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	33.4/ 2/ 33.	47.7/ 2/ 48.	44.6/ 3/ 134.	33.8/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.7/ 2/ 1.	.5/ 3/ 2.	1.0/ 2/ 1.
DILUTION FACTOR	36.28	24.42	9.83	35.96
HC CONCENTRATION PPM	9.	13.	24.	17.
CO CONCENTRATION PPM	52.	27.	21.	42.
CO2 CONCENTRATION PCT	.32	.50	1.31	.32
NOX CONCENTRATION PPM	32.9	47.0	132.5	32.8
HC MASS GRAMS	1.55	2.30	4.31	3.00
CO MASS GRAMS	18.22	9.59	7.44	14.77
CO2 MASS GRAMS	1761.6	2784.8	7391.6	1737.1
NOX MASS GRAMS	18.78	27.20	77.89	18.79
FUEL KG (LB)	.560 (1.23)	.876 (1.93)	2.314 (5.10)	.552 (1.22)
KW HR (HP HR)	1.80 (2.41)	3.09 (4.15)	9.55 (12.81)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	.86 (.64)	.74 (.56)	.45 (.34)	1.68 (1.26)
BSCO G/KW HR (G/HP HR)	10.15 (7.57)	3.10 (2.31)	.78 (.58)	8.28 (6.18)
BSCO2 G/KW HR (G/HP HR)	981.02 (731.54)	900.49 (671.49)	773.83 (577.05)	974.14 (726.42)
BSNOX G/KW HR (G/HP HR)	10.46 (7.80)	8.79 (6.56)	8.15 (6.08)	10.54 (7.86)
BSFC KG/KW HR (LB/HP HR)	.312 (.513)	.283 (.466)	.242 (.398)	.310 (.509)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	.69 (.51)
BSCO G/KW HR (G/HP HR)	3.08 (2.30)
BSCO2 G/KW HR (G/HP HR)	843. (629.)
BSNOX G/KW HR (G/HP HR)	8.79 (6.56)(bag)
BSFC KG/KW HR (LB/HP HR)	.265 (.436)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.950 (33.54)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0784 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2955 (.1341)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS- BAG NO_x
C-TRANS.

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN1
DATE 7/29/81
TIME 9:49
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-70. PCT , CVS 48. PCT
ABSOLUTE HUMIDITY 12.9 GM/KG(90.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.1 (10527.)	302.1 (10669.)	307.2 (10849.)	299.0 (10561.)
HC SAMPLE METER/RANGE/PPM	37.6/22/ 38.	25.6/22/ 26.	44.7/22/ 45.	23.2/22/ 23.
HC BCKGRD METER/RANGE/PPM	9.0/ 2/ 9.	8.0/ 2/ 8.	8.2/ 2/ 8.	8.3/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	36.1/13/ 33.	22.6/13/ 21.	26.6/13/ 24.	46.8/13/ 44.
CO BCKGRD METER/RANGE/PPM	.3/13/ 0.	.2/13/ 0.	.5/13/ 0.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.5/ 3/ .42	34.2/ 3/ .57	77.1/ 3/ 1.41	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	2.9/ 3/ .04	3.3/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	27.5/ 2/ 28.	41.3/ 2/ 41.	44.1/ 3/ 132.	33.8/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.5/ 2/ 1.	.0/13/ 0.	.8/ 2/ 1.
DILUTION FACTOR	31.65	23.27	9.46	36.46
HC CONCENTRATION PPM	29.	18.	37.	15.
CO CONCENTRATION PPM	32.	20.	23.	42.
CO2 CONCENTRATION PCT	.37	.53	1.36	.32
NOX CONCENTRATION PPM	27.0	40.8	132.2	33.0
HC MASS GRAMS	4.97	3.13	6.61	2.60
CO MASS GRAMS	11.24	7.00	8.20	14.72
CO2 MASS GRAMS	2013.4	2924.7	7675.7	1748.3
NOX MASS GRAMS	15.40	23.59	77.71	18.89
FUEL KG (LB)	.639 (1.41)	.919 (2.03)	2.405 (5.30)	.555 (1.22)
KW HR (HP HR)	1.66 (2.22)	2.87 (3.85)	9.56 (12.83)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	2.99 (2.23)	1.09 (.81)	.69 (.52)	1.46 (1.09)
BSCO G/KW HR (G/HP HR)	6.78 (5.05)	2.44 (1.82)	.86 (.64)	8.26 (6.16)
BSCO2 G/KW HR (G/HP HR)	1214.01 (905.28)	1019.76 (760.43)	802.52 (598.44)	980.45 (731.12)
BSNOX G/KW HR (G/HP HR)	9.29 (6.93)	8.22 (6.13)	8.12 (6.06)	10.59 (7.90)
BSFC KG/KW HR (LB/HP HR)	.385 (.633)	.320 (.527)	.251 (.413)	.311 (.512)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	15.87 (21.29)	
BSHC G/KW HR (G/HP HR)	1.09 (.81)	
BSCO G/KW HR (G/HP HR)	2.59 (1.93)	
BSCO2 G/KW HR (G/HP HR)	905. (675.)	
BSNOX G/KW HR (G/HP HR)	8.54 (6.37)	(bag)
BSFC KG/KW HR (LB/HP HR)	.285 (.468)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.996 (35.17)
MULTIPLIER FOR	G/TEST	1.211
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0763 (.0569)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2681 (.1216)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN1
DATE 7/29/81
TIME 10:30
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-48. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6171.	6276.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.7 (10523.)	302.0 (10667.)	307.1 (10846.)	298.9 (10558.)
HC SAMPLE METER/RANGE/PPM	21.3/22/ 21.	26.2/22/ 26.	44.3/22/ 44.	24.3/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	8.0/ 2/ 8.	7.8/ 2/ 8.	7.6/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	55.8/13/ 53.	32.1/13/ 30.	26.6/13/ 24.	48.3/13/ 45.
CO BCKGRD METER/RANGE/PPM	.8/13/ 1.	.9/13/ 1.	.9/13/ 1.	1.3/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	32.8/ 3/ .55	75.9/ 3/ 1.38	22.9/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.6/ 3/ .04	2.9/ 3/ .04	3.0/ 3/ .05
NOx SAMPLE METER/RANGE/PPM	31.9/ 2/ 32.	46.7/ 2/ 47.	44.2/ 3/ 133.	33.6/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.3/ 3/ 1.	.8/ 2/ 1.
DILUTION FACTOR	35.72	24.30	9.63	35.44
HC CONCENTRATION PPM	14.	19.	37.	17.
CO CONCENTRATION PPM	51.	28.	23.	43.
CO2 CONCENTRATION PCT	.33	.51	1.35	.33
NOX CONCENTRATION PPM	31.4	46.1	131.8	32.8
HC MASS GRAMS	2.37	3.23	6.61	2.91
CO MASS GRAMS	17.77	9.86	8.09	15.08
CO2 MASS GRAMS	1787.7	2808.3	7564.9	1788.1
NOX MASS GRAMS	17.90	26.65	77.42	18.77
FUEL KG (LB)	.569 (1.25)	.884 (1.95)	2.371 (5.23)	.568 (1.25)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.50 (12.74)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.32 (.98)	1.07 (.79)	.70 (.52)	1.63 (1.22)
BSCO G/KW HR (G/HP HR)	9.90 (7.38)	3.26 (2.43)	.85 (.63)	8.46 (6.31)
BSCO2 G/KW HR (G/HP HR)	995.59 (742.41)	926.78 (691.10)	796.14 (593.68)	1002.74 (747.74)
BSNOX G/KW HR (G/HP HR)	9.97 (7.43)	8.79 (6.56)	8.15 (6.08)	10.53 (7.85)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.292 (.480)	.250 (.410)	.319 (.524)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.11 (21.61)
BSHC G/KW HR (G/HP HR)	.94 (.70)
BSCO G/KW HR (G/HP HR)	3.15 (2.35)
BSCO2 G/KW HR (G/HP HR)	866. (646.)
BSNOX G/KW HR (G/HP HR)	8.74 (6.51) (bag)
BSFC KG/KW HR (LB/HP HR)	.273 (.448)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.970 (34.26)
MULTIPLIER FOR	G/TEST	1.243
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0575)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2830 (.1284)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x

H TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-2 RUN2
DATE 7/29/81
TIME 11:10
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.97 MM HG(29.29 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-57. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(81.0 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6212.	6275.	6381.	6212.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	298.9 (10558.)	302.0 (10665.)	307.1 (10845.)	298.9 (10558.)
HC SAMPLE METER/RANGE/PPM	20.6/22/ 21.	25.2/22/ 25.	44.3/22/ 44.	24.3/22/ 24.
HC BCKGRD METER/RANGE/PPM	8.7/ 2/ 9.	8.8/ 2/ 9.	8.5/ 2/ 9.	8.5/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	51.4/13/ 49.	31.0/13/ 29.	27.6/13/ 25.	49.7/13/ 47.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	.9/13/ 1.	1.2/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	21.8/ 3/ .35	33.3/ 3/ .55	77.0/ 3/ 1.41	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.7/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	31.4/ 2/ 31.	48.1/ 2/ 48.	45.7/ 3/ 137.	34.0/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	37.31	23.92	9.47	36.42
HC CONCENTRATION PPM	12.	17.	37.	16.
CO CONCENTRATION PPM	47.	27.	23.	45.
CO2 CONCENTRATION PCT	.32	.52	1.37	.32
NOX CONCENTRATION PPM	31.0	47.5	136.0	33.3
HC MASS GRAMS	2.09	2.92	6.51	2.76
CO MASS GRAMS	16.31	9.47	8.30	15.57
CO2 MASS GRAMS	1733.5	2849.7	7715.9	1756.0
NOX MASS GRAMS	17.73	27.45	79.90	19.05
FUEL KG (LB)	.551 (1.21)	.897 (1.98)	2.418 (5.33)	.558 (1.23)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.50 (12.74)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.17 (.87)	.96 (.72)	.68 (.51)	1.56 (1.16)
BSCO G/KW HR (G/HP HR)	9.08 (6.77)	3.13 (2.33)	.87 (.65)	8.80 (6.56)
BSCO2 G/KW HR (G/HP HR)	965.38 (719.88)	940.44 (701.29)	812.03 (605.53)	991.68 (739.49)
BSNOX G/KW HR (G/HP HR)	9.88 (7.36)	9.06 (6.76)	8.41 (6.27)	10.76 (8.02)
BSFC KG/KW HR (LB/HP HR)	.307 (.504)	.296 (.486)	.254 (.418)	.315 (.518)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.10 (21.59)
BSHC G/KW HR (G/HP HR)	.89 (.66)
BSCO G/KW HR (G/HP HR)	3.08 (2.30)
BSCO2 G/KW HR (G/HP HR)	873. (651.)
BSNOX G/KW HR (G/HP HR)	8.95 (6.68) (bag)
BSFC KG/KW HR (LB/HP HR)	.275 (.452)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.941 (33.22)
MULTIPLIER FOR	G/TEST	1.283
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0797 (.0594)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2900 (.1316)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS- BAG NO_x
H-TRANS.

PROJECT NO. 05 6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN3
DATE 7/29/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-62. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.6 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.7 (10516.)	301.8 (10659.)	306.9 (10839.)	298.8 (10552.)
HC SAMPLE METER/RANGE/PPM	20.2/22/ 20.	25.5/22/ 25.	44.7/22/ 45.	24.6/22/ 25.
HC BCKGRD METER/RANGE/PPM	7.1/ 2/ 7.	7.2/ 2/ 7.	7.2/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	55.4/13/ 53.	32.7/13/ 30.	26.8/13/ 25.	48.9/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	1.0/13/ 1.	.9/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.4/ 3/ .36	33.1/ 3/ .55	75.2/ 3/ 1.37	22.1/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.6/ 3/ .04	2.9/ 3/ .04	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	32.5/ 2/ 33.	48.1/ 2/ 48.	45.1/ 3/ 135.	33.1/ 2/ 33.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.6/ 3/ 2.	.9/ 2/ 1.
DILUTION FACTOR	36.24	24.07	9.73	36.77
HC CONCENTRATION PPM	13.	19.	38.	18.
CO CONCENTRATION PPM	51.	28.	23.	44.
CO2 CONCENTRATION PCT	.32	.51	1.35	.31
NOX CONCENTRATION PPM	32.0	47.5	133.7	32.2
HC MASS GRAMS	2.29	3.24	6.77	3.07
CO MASS GRAMS	17.57	9.98	8.11	15.33
CO2 MASS GRAMS	1758.5	2836.2	7479.3	1703.3
NOX MASS GRAMS	18.23	27.44	78.48	18.42
FUEL KG (LB)	.560 (1.23)	.893 (1.97)	2.344 (5.17)	.542 (1.19)
KW HR (HP HR)	1.81 (2.42)	3.04 (4.08)	9.50 (12.74)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.27 (.94)	1.06 (.79)	.71 (.53)	1.73 (1.29)
BSCO G/KW HR (G/HP HR)	9.72 (7.25)	3.28 (2.44)	.85 (.64)	8.66 (6.45)
BSCO2 G/KW HR (G/HP HR)	972.53 (725.21)	932.16 (695.11)	787.12 (586.96)	961.92 (717.31)
BSNOX G/KW HR (G/HP HR)	10.08 (7.52)	9.02 (6.72)	8.26 (6.16)	10.40 (7.76)
BSFC KG/KW HR (LB/HP HR)	.309 (.509)	.294 (.483)	.247 (.406)	.306 (.503)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.12 (21.62)	
BSHC G/KW HR (G/HP HR)	.95 (.71)	
BSCO G/KW HR (G/HP HR)	3.16 (2.36)	
BSCO2 G/KW HR (G/HP HR)	854. (637.)	
BSNOX G/KW HR (G/HP HR)	8.84 (6.59)	(bag)
BSFC KG/KW HR (LB/HP HR)	.269 (.442)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.949 (33.50)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0788 (.0588)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2928 (.1328)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS- BAG NO_x

H-TRANS.

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN4
DATE 7/29/81
TIME 12:40
DYNO NO. 5

DIESEL EM 465 F
BAG CART NO. 1

BAROMETER 743.46 MM HG(29.27 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-61. PCT , CVS-56. PCT
ABSOLUTE HUMIDITY 12.0 GM/KG(84.0 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6171.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	297.7 (10515.)	301.7 (10658.)	306.8 (10838.)	298.7 (10551.)
HC SAMPLE METER/RANGE/PPM	20.8/22/ 21.	25.9/22/ 26.	44.9/22/ 45.	24.5/22/ 25.
HC BCKGRD METER/RANGE/PPM	7.2/ 2/ 7.	7.3/ 2/ 7.	6.8/ 2/ 7.	6.7/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	54.6/13/ 52.	31.8/13/ 29.	25.7/13/ 24.	52.1/13/ 49.
CO BCKGRD METER/RANGE/PPM	.2/13/ 0.	.2/13/ 0.	.5/13/ 0.	.7/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.0/ 3/ .36	33.0/ 3/ .55	76.0/ 3/ 1.39	23.3/ 3/ .38
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.9/ 3/ .04	3.3/ 3/ .05	3.3/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	31.2/ 2/ 31.	48.6/ 2/ 49.	45.1/ 3/ 135.	34.5/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.8/ 2/ 1.	.4/ 3/ 1.	1.0/ 2/ 1.
DILUTION FACTOR	36.93	24.15	9.61	34.77
HC CONCENTRATION PPM	14.	19.	39.	18.
CO CONCENTRATION PPM	50.	28.	22.	47.
CO2 CONCENTRATION PCT	.31	.51	1.34	.33
NOX CONCENTRATION PPM	30.6	47.8	134.2	33.5
HC MASS GRAMS	2.36	3.28	6.88	3.11
CO MASS GRAMS	17.47	9.94	7.88	16.51
CO2 MASS GRAMS	1712.5	2801.3	7539.9	1800.0
NOX MASS GRAMS	17.44	27.61	70.79	19.16
FUEL KG (LB)	.545 (1.20)	.882 (1.94)	2.363 (5.21)	.573 (1.26)
KW HR (HP HR)	1.80 (2.41)	3.03 (4.06)	9.53 (12.78)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.32 (.98)	1.08 (.81)	.72 (.54)	1.74 (1.30)
BSCO G/KW HR (G/HP HR)	9.73 (7.26)	3.28 (2.45)	.83 (.62)	9.26 (6.90)
BSCO2 G/KW HR (G/HP HR)	953.68 (711.16)	924.47 (689.38)	791.43 (590.17)	1009.45 (752.75)
BSNOX G/KW HR (G/HP HR)	9.71 (7.24)	9.11 (6.79)	8.27 (6.17)	10.74 (8.01)
BSFC KG/KW HR (LB/HP HR)	.304 (.499)	.291 (.479)	.248 (.408)	.321 (.528)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.14 (21.64)
BSHC G/KW HR (G/HP HR)	.97 (.72)
BSCO G/KW HR (G/HP HR)	3.21 (2.39)
BSCO2 G/KW HR (G/HP HR)	859. (640.)
BSNOX G/KW HR (G/HP HR)	8.86 (6.61) (bag)
BSFC KG/KW HR (LB/HP HR)	.270 (.445)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.949 (33.53)
MULTIPLIER FOR	G/TEST	1.269
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0787 (.0587)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2909 (.1319)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NOx
H-TRANS.

ENGINE NO.030
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.030 2 RUNS
DATE 7/29/81
TIME 1:20
DYNO NO. 5

PROJECT NO. 11-6599-001

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 743.20 MM HG(29.26 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE 45. PCT , CVS 52. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(80.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	298.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.6 (10510.)	301.6 (10652.)	306.7 (10833.)	298.6 (10546.)
HC SAMPLE METER/RANGE/PPM	19.9/22/ 20.	25.0/22/ 25.	44.9/22/ 45.	23.8/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.7/ 2/ 8.	7.8/ 2/ 8.	7.2/ 2/ 7.	6.7/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	53.5/13/ 51.	32.1/13/ 30.	27.0/13/ 25.	50.9/13/ 48.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.6/13/ 1.	.6/13/ 1.	.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.7/ 3/ .37	33.2/ 3/ .55	77.1/ 3/ 1.41	22.8/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.6/ 3/ .04	3.0/ 3/ .05	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.9/ 2/ 34.	49.4/ 2/ 49.	47.1/ 3/ 141.	35.1/ 2/ 35.
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ 1.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	35.76	24.00	9.46	35.58
HC CONCENTRATION PPM	12.	18.	38.	17.
CO CONCENTRATION PPM	49.	28.	23.	46.
CO2 CONCENTRATION PCT	.33	.51	1.37	.33
NOX CONCENTRATION PPM	33.3	48.8	140.2	34.4
HC MASS GRAMS	2.13	3.05	6.80	2.98
CO MASS GRAMS	16.95	9.92	8.20	16.14
CO2 MASS GRAMS	1777.4	2844.5	7687.4	1792.9
NOX MASS GRAMS	18.96	28.17	82.27	19.66
FUEL KG (LB)	.565 (1.25)	.895 (1.97)	2.409 (5.31)	.570 (1.26)
KW HR (HP HR)	1.78 (2.39)	3.03 (4.06)	9.53 (12.78)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.19 (.89)	1.01 (.75)	.71 (.53)	1.67 (1.25)
BSCO G/KW HR (G/HP HR)	9.51 (7.09)	3.27 (2.44)	.87 (.65)	9.05 (6.75)
BSCO2 G/KW HR (G/HP HR)	996.75 (743.28)	938.71 (700.00)	806.91 (601.71)	1005.43 (749.75)
BSNOX G/KW HR (G/HP HR)	10.64 (7.93)	9.30 (6.93)	8.64 (6.44)	11.02 (8.22)
BSFC KG/KW HR (LB/HP HR)	.317 (.521)	.295 (.486)	.253 (.416)	.320 (.526)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.12 (21.62)
BSHC G/KW HR (G/HP HR)	.93 (.69)
BSCO G/KW HR (G/HP HR)	3.18 (2.37)
BSCO2 G/KW HR (G/HP HR)	875. (652.)
BSNOX G/KW HR (G/HP HR)	9.24 (6.89) (bag)
BSFC KG/KW HR (LB/HP HR)	.275 (.453)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.939 (33.18)
MULTIPLIER FOR	G/TEST	1.282
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0795 (.0593)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2888 (.1310)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H TRANS.

PROJECT NO. 05-2598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID) 0
CVS NO. 10

TEST NO.D30-2 RUN6
DATE 7/29/81
TIME 2:00
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.19 MM HG(29.22 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY - ENGINE 56. PCT , CVS 49. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)	182.9 (7.2)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	6192.	6275.	6380.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	297.1 (10495.)	301.1 (10636.)	306.2 (10814.)	298.1 (10529.)
HC SAMPLE METER/RANGE/PPM	19.5/22/ 20.	24.7/22/ 25.	44.5/22/ 45.	23.2/22/ 23.
HC BCKGRD METER/RANGE/PPM	5.5/ 2/ 6.	5.5/ 2/ 6.	5.8/ 2/ 6.	5.3/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	56.3/13/ 54.	33.9/13/ 31.	26.7/13/ 24.	48.4/13/ 46.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.0/13/ 1.	.9/13/ 1.	.5/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.8/ 3/ .32	33.3/ 3/ .55	75.0/ 3/ 1.37	22.3/ 3/ .36
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.7/ 3/ .04	3.2/ 3/ .05	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.1/ 2/ 33.	49.4/ 2/ 49.	45.1/ 3/ 135.	34.2/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.4/ 3/ 1.	.7/ 2/ 1.
DILUTION FACTOR	35.57	23.91	9.76	36.44
HC CONCENTRATION PPM	14.	19.	39.	18.
CO CONCENTRATION PPM	51.	30.	23.	44.
CO2 CONCENTRATION PCT	.33	.52	1.32	.32
NOX CONCENTRATION PPM	32.6	48.8	134.2	33.5
HC MASS GRAMS	2.43	3.38	6.94	3.11
CO MASS GRAMS	17.77	10.39	8.10	15.19
CO2 MASS GRAMS	1800.8	2041.9	7415.3	1734.8
NOX MASS GRAMS	10.54	28.13	78.61	19.11
FUEL KG (LB)	.575 (1.27)	.895 (1.97)	2.324 (5.12)	.552 (1.22)
KW HR (HP HR)	1.78 (2.39)	3.04 (4.08)	9.51 (12.76)	1.77 (2.37)
BSHC G/KW HR (G/HP HR)	1.36 (1.02)	1.11 (.83)	.73 (.54)	1.75 (1.31)
BSCO G/KW HR (G/HP HR)	9.97 (7.43)	3.41 (2.55)	.85 (.63)	8.58 (6.40)
BSCO2 G/KW HR (G/HP HR)	1014.35 (756.40)	934.02 (696.50)	779.37 (581.18)	979.71 (730.57)
BSNOX G/KW HR (G/HP HR)	10.40 (7.75)	9.24 (6.89)	8.26 (6.16)	10.79 (8.05)
BSFC KG/KW HR (LB/HP HR)	.323 (.531)	.294 (.484)	.244 (.402)	.312 (.512)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.11 (21.61)
BSHC G/KW HR (G/HP HR)	.98 (.73)
BSCO G/KW HR (G/HP HR)	3.19 (2.38)
BSCO2. G/KW HR (G/HP HR)	857. (639.)
BSNOX G/KW HR (G/HP HR)	8.96 (6.68)(bag)
BSFC KG/KW HR (LB/HP HR)	.270 (.444)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.942 (33.26)
MULTIPLIER FOR	G/TEST	1.277
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0793 (.0591)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2938 (.1333)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN1
DATE 8/ 4/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	172.7 (6.8)	172.7 (6.8)	172.7 (6.8)	172.7 (6.8)
BLOWER INLET TEMP. DEG. C(DEG. F)	40.6 (105.0)	40.6 (105.0)	40.6 (105.0)	40.6 (105.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	304.0 (10738.)	308.2 (10884.)	313.4 (11068.)	305.1 (10775.)
HC SAMPLE METER/RANGE/PPM	3.9/23/ 19.	3.8/23/ 19.	7.4/23/ 37.	2.8/23/ 14.
HC BCKGRD METER/RANGE/PPM	6.2/ 2/ 6.	6.2/ 2/ 6.	6.6/ 2/ 7.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	38.6/13/ 36.	22.9/13/ 21.	26.3/13/ 24.	39.3/13/ 37.
CO BCKGRD METER/RANGE/PPM	.2/13/ 0.	.2/13/ 0.	.6/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	27.0/ 3/ .44	34.5/ 3/ .58	76.5/ 3/ 1.40	23.0/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.0/ 3/ .05	3.5/ 3/ .05	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	2.4/14/ 24.	4.0/14/ 40.	15.9/14/ 159.	3.1/14/ 31.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.3/ 3/ 1.	.6/ 2/ 1.
DILUTION FACTOR	29.91	23.08	9.55	35.46
HC CONCENTRATION PPM	13.	13.	31.	8.
CO CONCENTRATION PPM	35.	20.	22.	35.
CO2 CONCENTRATION PCT	.40	.53	1.35	.34
NOX CONCENTRATION PPM	23.6	40.0	158.3	30.4
HC MASS GRAMS	2.36	2.32	5.63	1.40
CO MASS GRAMS	12.28	7.21	8.21	12.33
CO2 MASS GRAMS	2217.1	3006.3	7743.6	1876.2
NOX MASS GRAMS	13.75	23.60	94.89	17.77
FUEL KG (LB)	.700 (1.54)	.944 (2.08)	2.426 (5.35)	.593 (1.31)
KW HR (HP HR)	1.48 (1.99)	2.66 (3.56)	9.51 (12.76)	1.73 (2.32)
BSHC G/KW HR (G/HP HR)	1.59 (1.19)	.87 (.65)	.59 (.44)	.81 (.60)
BSCO G/KW HR (G/HP HR)	8.27 (6.17)	2.71 (2.02)	.86 (.64)	7.11 (5.30)
BSCO2 G/KW HR (G/HP HR)	1494.10 (1114.15)	1131.86 (844.03)	813.87 (606.90)	1082.45 (807.18)
BSNOX G/KW HR (G/HP HR)	9.27 (6.91)	8.88 (6.63)	9.97 (7.44)	10.25 (7.64)
BSFC KG/KW HR (LB/HP HR)	.472 (.776)	.355 (.584)	.255 (.419)	.342 (.562)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	15.39 (20.64)
BSHC G/KW HR (G/HP HR)	.76 (.57)
BSCO G/KW HR (G/HP HR)	2.60 (1.94)
BSCO2 G/KW HR (G/HP HR)	965. (719.)
BSNOX G/KW HR (G/HP HR)	9.75 (7.27)
BSFC KG/KW HR (LB/HP HR)	.303 (.498)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	1.036 (36.60)
MULTIPLIER FOR	G/TEST	1.188
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0576)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2547 (.1155)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN1
DATE 8/ 4/81
TIME 10:54
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-63. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(79.9 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)
BLOWER INLET P MM. H2O(IN. H2O)	177.8 (7.0)	177.8 (7.0)	177.8 (7.0)	177.8 (7.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	295.7 (10444.)	299.7 (10584.)	304.7 (10763.)	296.6 (10478.)
HC SAMPLE METER/RANGE/PPM	22.4/22/ 22.	27.2/22/ 27.	46.0/22/ 46.	23.8/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.9/ 2/ 7.	6.6/ 2/ 7.	6.4/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	58.4/13/ 56.	32.7/13/ 30.	27.6/13/ 25.	49.2/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.6/13/ 1.	.9/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.5/ 3/ .40	36.5/ 3/ .61	79.0/ 3/ 1.45	24.0/ 3/ .39
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	3.6/14/ 36.	5.7/14/ 57.	17.2/14/ 172.	3.8/14/ 38.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 3/ 1.	.5/ 2/ 1.
DILUTION FACTOR	32.96	21.66	9.20	33.74
HC CONCENTRATION PPM	16.	21.	40.	18.
CO CONCENTRATION PPM	54.	29.	23.	44.
CO2 CONCENTRATION PCT	.35	.58	1.41	.35
NOX CONCENTRATION PPM	35.7	56.6	171.5	37.3
HC MASS GRAMS	2.67	3.57	7.06	3.01
CO MASS GRAMS	18.47	10.01	8.29	15.22
CO2 MASS GRAMS	1919.1	3164.8	7896.1	1918.6
NOX MASS GRAMS	20.20	32.47	99.98	21.19
FUEL KG (LB)	.610 (1.35)	.996 (2.20)	2.475 (5.46)	.609 (1.34)
KW HR (HP HR)	1.81 (2.42)	3.07 (4.11)	9.56 (12.83)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.48 (1.10)	1.16 (.87)	.74 (.55)	1.69 (1.26)
BSCO G/KW HR (G/HP HR)	10.22 (7.62)	3.26 (2.43)	.87 (.65)	8.53 (6.36)
BSCO2 G/KW HR (G/HP HR)	1061.36 (791.46)	1031.68 (769.32)	825.57 (615.62)	1075.95 (802.34)
BSNOX G/KW HR (G/HP HR)	11.17 (8.33)	10.58 (7.89)	10.45 (7.80)	11.88 (8.86)
BSFC KG/KW HR (LB/HP HR)	.338 (.555)	.325 (.534)	.259 (.425)	.342 (.562)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	1.00 (.75)
BSCO G/KW HR (G/HP HR)	3.20 (2.39)
BSCO2 G/KW HR (G/HP HR)	918. (685.)
BSNOX G/KW HR (G/HP HR)	10.72 (7.99)
BSFC KG/KW HR (LB/HP HR)	.289 (.475)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.945 (33.39)
MULTIPLIER FOR	G/TEST	1.266
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0780 (.0582)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2699 (.1224)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS- INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN2
DATE 8/ 4/81
TIME 11:40
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.3 GM/KG(79.2 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)
BLOWER REVOLUTIONS	6190.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	295.4 (10435.)	299.5 (10578.)	304.6 (10757.)	296.5 (10472.)
HC SAMPLE METER/RANGE/PPM	23.1/22/ 23.	27.4/22/ 27.	47.2/22/ 47.	24.7/22/ 25.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	6.9/ 2/ 7.	7.0/ 2/ 7.	6.4/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	58.6/13/ 56.	32.5/13/ 30.	26.4/13/ 24.	49.0/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.9/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.0/ 3/ .39	35.5/ 3/ .59	76.0/ 3/ 1.39	24.0/ 3/ .39
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	3.6/14/ 36.	5.7/14/ 57.	17.4/14/ 174.	3.8/14/ 38.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.3/ 3/ 1.	.4/ 2/ 0.
DILUTION FACTOR	33.67	22.32	9.61	33.74
HC CONCENTRATION PPM	16.	21.	41.	19.
CO CONCENTRATION PPM	54.	28.	22.	44.
CO2 CONCENTRATION PCT	.35	.56	1.35	.35
NOX CONCENTRATION PPM	36.2	56.3	172.9	37.9
HC MASS GRAMS	2.79	3.59	7.19	3.17
CO MASS GRAMS	18.55	9.92	7.93	15.21
CO2 MASS GRAMS	1910.8	3062.5	7545.4	1917.6
NOX MASS GRAMS	20.46	32.23	100.75	21.50
FUEL KG (LB)	.608 (1.34)	.964 (2.13)	2.365 (5.21)	.609 (1.34)
KW HR (HP HR)	1.83 (2.46)	3.07 (4.11)	9.53 (12.78)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	1.52 (1.13)	1.17 (.87)	.75 (.56)	1.76 (1.32)
BSCO G/KW HR (G/HP HR)	10.12 (7.54)	3.23 (2.41)	.83 (.62)	8.47 (6.32)
BSCO2 G/KW HR (G/HP HR)	1042.41 (777.33)	998.33 (744.46)	792.00 (590.60)	1067.91 (796.34)
BSNOX G/KW HR (G/HP HR)	11.16 (8.32)	10.51 (7.84)	10.58 (7.89)	11.98 (8.93)
BSFC KG/KW HR (LB/HP HR)	.332 (.545)	.314 (.517)	.248 (.408)	.339 (.557)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	1.03 (.77)
BSCO G/KW HR (G/HP HR)	3.18 (2.37)
BSCO2 G/KW HR (G/HP HR)	890. (664.)
BSNOX G/KW HR (G/HP HR)	10.78 (8.04)
BSFC KG/KW HR (LB/HP HR)	.280 (.461)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.941 (33.23)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0783 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2796 (.1268)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN1
DATE 8/ 4/81
TIME
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)	360.7 (14.2)
BLOWER INLET P MM. H2O(IN. H2O)	172.7 (6.8)	172.7 (6.8)	172.7 (6.8)	172.7 (6.8)
BLOWER INLET TEMP. DEG. C(DEG. F)	40.6 (105.0)	40.6 (105.0)	40.6 (105.0)	40.6 (105.0)
BLOWER REVOLUTIONS	6191.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	304.0 (10738.)	308.2 (10884.)	313.4 (11068.)	305.1 (10775.)
HC SAMPLE METER/RANGE/PPM	3.9/23/ 19.	3.8/23/ 19.	7.4/23/ 37.	2.8/23/ 14.
HC BCKGRD METER/RANGE/PPM	6.2/ 2/ 6.	6.2/ 2/ 6.	6.6/ 2/ 7.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	38.6/13/ 36.	22.9/13/ 21.	26.3/13/ 24.	39.3/13/ 37.
CO BCKGRD METER/RANGE/PPM	.2/13/ 0.	.2/13/ 0.	.6/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	27.0/ 3/ .44	34.5/ 3/ .58	76.5/ 3/ 1.40	23.0/ 3/ .37
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.0/ 3/ .05	3.5/ 3/ .05	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	26.3/ 2/ 26.	38.3/ 2/ 38.	42.0/ 3/ 126.	32.7/ 2/ 33.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.3/ 3/ 1.	.6/ 2/ 1.
DILUTION FACTOR	29.91	23.08	9.55	35.46
HC CONCENTRATION PPM	13.	13.	31.	8.
CO CONCENTRATION PPM	35.	20.	22.	35.
CO2 CONCENTRATION PCT	.40	.53	1.35	.34
NOX CONCENTRATION PPM	26.1	38.0	125.2	32.1
HC MASS GRAMS	2.36	2.32	5.63	1.40
CO MASS GRAMS	12.28	7.21	8.21	12.33
CO2 MASS GRAMS	2217.1	3006.3	7743.6	1876.2
NOX MASS GRAMS	15.18	22.41	75.05	18.74
FUEL KG (LB)	.700 (1.54)	.944 (2.08)	2.426 (5.35)	.593 (1.31)
KW HR (HP HR)	1.48 (1.99)	2.66 (3.56)	9.51 (12.76)	1.73 (2.32)
BSHC G/KW HR (G/HP HR)	1.59 (1.19)	.87 (.65)	.59 (.44)	.81 (.60)
BSCO G/KW HR (G/HP HR)	8.27 (6.17)	2.71 (2.02)	.86 (.64)	7.11 (5.30)
BSCO2 G/KW HR (G/HP HR)	1494.10 (1114.15)	1131.86 (844.03)	813.87 (606.90)	1082.45 (807.18)
BSNOX G/KW HR (G/HP HR)	10.23 (7.63)	8.44 (6.29)	7.89 (5.88)	10.81 (8.06)
BSFC KG/KW HR (LB/HP HR)	.472 (.776)	.355 (.584)	.255 (.419)	.342 (.562)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	15.39 (20.64)
BSHC G/KW HR (G/HP HR)	.76 (.57)
BSCO G/KW HR (G/HP HR)	2.60 (1.94)
BSCO2 G/KW HR (G/HP HR)	965. (719.)
BSNOX G/KW HR (G/HP HR)	8.54 (6.37)(bag)
BSFC KG/KW HR (LB/HP HR)	.303 (.498)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	1.036 (36.60)
MULTIPLIER FOR	G/TEST	1.188
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0772 (.0576)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2547 (.1155)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN1
DATE 8/ 4/81
TIME 10:54
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-63. PCT
ABSOLUTE HUMIDITY 11.4 GM/KG(79.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)	358.1 (14.1)
BLOWER INLET P MM. H2O(IN. H2O)	177.8 (7.0)	177.8 (7.0)	177.8 (7.0)	177.8 (7.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)
BLOWER REVOLUTIONS	6192.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	295.7 (10444.)	299.7 (10584.)	304.7 (10763.)	296.6 (10478.)
HC SAMPLE METER/RANGE/PPM	22.4/22/ 22.	27.2/22/ 27.	46.0/22/ 46.	23.8/22/ 24.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.9/ 2/ 7.	6.6/ 2/ 7.	6.4/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	58.4/13/ 56.	32.7/13/ 30.	27.6/13/ 25.	49.2/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.6/13/ 1.	.9/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.5/ 3/ .40	36.5/ 3/ .61	79.0/ 3/ 1.45	24.0/ 3/ .39
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	33.3/ 2/ 33.	49.4/ 2/ 49.	45.2/ 3/ 136.	34.2/ 2/ 34.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 3/ 1.	.5/ 2/ 1.
DILUTION FACTOR	32.96	21.66	9.20	33.74
HC CONCENTRATION PPM	16.	21.	40.	18.
CO CONCENTRATION PPM	54.	29.	23.	44.
CO2 CONCENTRATION PCT	.35	.58	1.41	.35
NOX CONCENTRATION PPM	33.0	48.9	134.8	33.7
HC MASS GRAMS	2.67	3.57	7.06	3.01
CO MASS GRAMS	18.47	10.01	8.29	15.22
CO2 MASS GRAMS	1919.1	3164.8	7896.1	1918.6
NOX MASS GRAMS	18.67	28.04	78.50	19.13
FUEL KG (LB)	.610 (1.35)	.996 (2.20)	2.475 (5.46)	.609 (1.34)
KW HR (HP HR)	1.81 (2.42)	3.07 (4.11)	9.56 (12.83)	1.78 (2.39)
BSHC G/KW HR (G/HP HR)	1.48 (1.10)	1.16 (.87)	.74 (.55)	1.69 (1.26)
BSCO G/KW HR (G/HP HR)	10.22 (7.62)	3.26 (2.43)	.87 (.65)	8.53 (6.36)
BSCO2 G/KW HR (G/HP HR)	1061.36 (791.46)	1031.68 (769.32)	825.57 (615.62)	1075.95 (802.34)
BSNOX G/KW HR (G/HP HR)	10.33 (7.70)	9.14 (6.82)	8.22 (6.13)	10.73 (8.00)
BSFC KG/KW HR (LB/HP HR)	.338 (.555)	.325 (.534)	.259 (.425)	.342 (.562)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)
BSHC G/KW HR (G/HP HR)	1.00 (.75)
BSCO G/KW HR (G/HP HR)	3.20 (2.39)
BSCO2 G/KW HR (G/HP HR)	918. (685.)
BSNOX G/KW HR (G/HP HR)	8.90 (6.64)(bag)
BSFC KG/KW HR (LB/HP HR)	.289 (.475)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.945 (33.39)
MULTIPLIER FOR	G/TEST	1.266
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0780 (.0582)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2699 (.1224)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-2. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D30
ENGINE MODEL 0 DDA 8V71TA
ENGINE 0.0 L(0. CID)
CVS NO. 10

TEST NO.D30-3 RUN2
DATE 8/ 4/81
TIME 11:40
DYNO NO. 5

DIESEL EM-465-F
BAG CART NO. 1

BAROMETER 742.70 MM HG(29.24 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-62. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 11.3 GM/KG(79.2 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)	363.2 (14.3)
BLOWER INLET P MM. H2O(IN. H2O)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)	180.3 (7.1)
BLOWER INLET TEMP. DEG. C(DEG. F)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)	51.7 (125.0)
BLOWER REVOLUTIONS	6190.	6275.	6381.	6212.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	295.4 (10435.)	299.5 (10578.)	304.6 (10757.)	296.5 (10472.)
HC SAMPLE METER/RANGE/PPM	23.1/22/ 23.	27.4/22/ 27.	47.2/22/ 47.	24.7/22/ 25.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	6.9/ 2/ 7.	7.0/ 2/ 7.	6.4/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	58.6/13/ 56.	32.5/13/ 30.	26.4/13/ 24.	49.0/13/ 46.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.9/13/ 1.	1.0/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	24.0/ 3/ .39	35.5/ 3/ .59	76.0/ 3/ 1.39	24.0/ 3/ .39
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	32.4/ 2/ 32.	47.3/ 2/ 47.	42.3/ 3/ 127.	33.0/ 2/ 33.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.3/ 3/ 1.	.4/ 2/ 0.
DILUTION FACTOR	33.67	22.32	9.61	33.74
HC CONCENTRATION PPM	16.	21.	41.	19.
CO CONCENTRATION PPM	54.	28.	22.	44.
CO2 CONCENTRATION PCT	.35	.56	1.35	.35
NOX CONCENTRATION PPM	32.1	46.9	126.1	32.6
HC MASS GRAMS	2.79	3.59	7.19	3.17
CO MASS GRAMS	10.55	9.92	7.93	15.21
CO2 MASS GRAMS	1910.8	3062.5	7545.4	1917.6
NOX MASS GRAMS	18.15	26.88	73.46	18.50
FUEL KG (LB)	.608 (1.34)	.964 (2.13)	2.365 (5.21)	.609 (1.34)
KW HR (HP HR)	1.83 (2.46)	3.07 (4.11)	9.53 (12.78)	1.80 (2.41)
BSHC G/KW HR (G/HP HR)	1.52 (1.13)	1.17 (.87)	.75 (.56)	1.76 (1.32)
BSCO G/KW HR (G/HP HR)	10.12 (7.54)	3.23 (2.41)	.83 (.62)	8.47 (6.32)
BSCO2 G/KW HR (G/HP HR)	1042.41 (777.33)	998.33 (744.46)	792.00 (590.60)	1067.91 (796.34)
BSNOX G/KW HR (G/HP HR)	9.90 (7.38)	8.76 (6.53)	7.71 (5.75)	10.30 (7.68)
BSFC KG/KW HR (LB/HP HR)	.332 (.545)	.314 (.517)	.248 (.408)	.339 (.557)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	16.22 (21.76)	
BSHC G/KW HR (G/HP HR)	1.03 (.77)	
BSCO G/KW HR (G/HP HR)	3.18 (2.37)	
BSCO2 G/KW HR (G/HP HR)	890. (664.)	
BSNOX G/KW HR (G/HP HR)	8.44 (6.30)	(bag)
BSFC KG/KW HR (LB/HP HR)	.280 (.461)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.941 (33.23)
MULTIPLIER FOR	G/TEST	1.271
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0783 (.0584)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2796 (.1268)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. 13-MODE FEDERAL DIESEL EMISSION CYCLE 1979

ENGINE:INTERNATIONAL HARVESTER DTI-466-B
TEST NO.31-2 FUEL:EM-477-F PROJECT: 05-6598-001
BAROMETER 29.10
DATE: 08/12/81

MODE	POWER PCT	ENGINE SPEED COND / RPM	TORQUE OBS LB-FT	POWER OBS BHP	FUEL FLOW LB/MIN	AIR FLOW LB/MIN	INTAKE HUMID GR/LB	NOX CORR FACT	MEASURED HC PPM	MEASURED CO PPM	MEASURED CO2 PCT	MEASURED NOX PPM	CALCULATED GRAMS / HOUR HC	CALCULATED GRAMS / HOUR CO	CALCULATED GRAMS / HOUR NOX	MODE
1		IDLE / 710.	0.	.0	.035	5.55	84.	1.053	316.	212.	1.54	165.	19.	26.	34.	1
2	2	INTER / 1800.	9.	3.1	.167	14.71	84.	1.048	476.	332.	2.21	109.	96.	134.	75.	2
3	25	INTER / 1800.	120.	41.1	.342	16.30	84.	1.039	396.	306.	4.52	235.	84.	126.	164.	3
4	50	INTER / 1800.	240.	82.3	.608	18.82	84.	1.028	216.	186.	6.65	325.	57.	94.	275.	4
5	75	INTER / 1800.	360.	123.4	.863	23.84	84.	1.025	92.	199.	8.00	415.	29.	119.	413.	5
6	100	INTER / 1800.	480.	164.5	1.096	27.62	84.	1.021	64.	279.	8.68	485.	24.	194.	563.	6
7		IDLE / 710.	0.	.0	.042	5.46	84.	1.051	272.	133.	1.63	175.	19.	18.	41.	7
8	100	RATED / 2600.	408.	202.0	1.547	43.18	84.	1.025	68.	345.	7.71	415.	40.	381.	767.	8
9	75	RATED / 2600.	306.	151.5	1.199	38.38	84.	1.029	88.	226.	6.74	340.	45.	222.	560.	9
10	50	RATED / 2600.	204.	101.0	.868	31.74	86.	1.040	132.	226.	5.68	240.	57.	190.	343.	10
11	25	RATED / 2600.	102.	50.5	.570	27.15	86.	1.047	272.	306.	4.39	165.	99.	217.	200.	11
12	2	RATED / 2600.	9.	4.5	.318	22.99	86.	1.056	448.	439.	3.02	110.	128.	249.	107.	12
13		IDLE / 710.	0.	.0	.042	5.55	86.	1.063	340.	226.	1.41	145.	27.	36.	40.	13

MODE	CALCULATED GRAMS/LB-FUEL HC	CALCULATED GRAMS/LB-FUEL CO	CALCULATED GRAMS/LB-FUEL NOX	CALCULATED GRAMS/BHP-HR HC	CALCULATED GRAMS/BHP-HR CO	CALCULATED GRAMS/BHP-HR NOX	F/A DRY MEAS	F/A STOICH	"PHI"	WET HC CORR FACT	F/A CALC	F/A PCT MEAS	POWER CORR FACT	BSFC CORR LB/HP-HR	MODAL WEIGHT FACTOR	MODE
1	9.15	12.29	16.42	******	******	******	.0064	.0695	.092	.983	.0075	17.9	.990	*****	.067	1
2	9.63	13.38	7.51	31.22	43.36	24.34	.0115	.0695	.165	.978	.0108	-6.0	.998	3.248	.080	2
3	4.08	6.15	8.01	2.03	3.07	3.99	.0212	.0695	.305	.959	.0214	.9	1.000	.498	.080	3
4	1.55	2.57	7.52	.69	1.14	3.34	.0327	.0695	.471	.943	.0309	-5.6	1.004	.442	.080	4
5	.56	2.29	7.98	.23	.96	3.35	.0366	.0695	.527	.932	.0369	.6	1.010	.416	.080	5
6	.36	2.76	8.56	.14	1.18	3.42	.0402	.0695	.578	.927	.0399	-.7	1.018	.393	.080	6
7	7.51	7.35	16.59	******	******	******	.0077	.0695	.111	.983	.0079	2.0	.998	*****	.067	7
8	.43	4.11	8.27	.20	1.89	3.80	.0363	.0695	.522	.934	.0356	-1.7	1.054	.436	.080	8
9	.63	3.08	7.79	.30	1.46	3.70	.0316	.0695	.455	.942	.0312	-1.1	1.042	.456	.080	9
10	1.10	3.65	6.58	.57	1.88	3.39	.0277	.0695	.399	.950	.0265	-4.3	1.028	.502	.080	10
11	2.09	6.35	5.05	1.96	4.30	3.96	.0213	.0695	.306	.960	.0207	-2.4	1.018	.665	.080	11
12	6.73	13.03	5.63	28.84	55.87	24.12	.0140	.0695	.202	.971	.0146	4.1	1.011	4.241	.080	12
13	10.67	14.22	15.83	******	******	******	.0076	.0695	.109	.985	.0069	-8.9	.996	*****	.067	13

CYCLE COMPOSITE USING 13-MODE WEIGHT FACTORS

BSHC = .771 GRAM/BHP-HR
BSCO = 2.157 GRAM/BHP-HR
BSNOX = 3.859 GRAM/BHP-HR
BSHC + BSNOX = 4.630 GRAM/BHP-HR
CORR. BSFC = .485 LBS/BHP-HR

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN1
DATE 8/18/81
TIME 10:30
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.14 MM HG(29.10 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-65. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.4 GM/KG(87.1 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.3 (119.0)	48.9 (120.0)	48.9 (120.0)	48.3 (119.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.1 (5619.)	161.1 (5689.)	163.8 (5785.)	159.6 (5637.)
HC SAMPLE METER/RANGE/PPM	9.6/23/ 48.	7.5/23/ 38.	8.1/23/ 40.	5.8/23/ 29.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	7.4/ 2/ 7.	7.2/ 2/ 7.	7.1/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	67.2/13/ 65.	49.8/13/ 47.	55.8/13/ 53.	33.6/13/ 31.
CO BCKGRD METER/RANGE/PPM	1.0/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	2.0/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	29.2/ 3/ .48	39.8/ 3/ .67	89.4/ 3/ 1.67	25.6/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	3.0/ 3/ .05	2.9/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	9.0/13/ 27.	12.1/13/ 36.	32.0/13/ 96.	8.3/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.2/ 2/ 0.
DILUTION FACTOR	27.21	19.64	8.00	31.61
HC CONCENTRATION PPM	41.	31.	34.	22.
CO CONCENTRATION PPM	62.	44.	49.	28.
CO2 CONCENTRATION PCT	.44	.63	1.63	.37
NOX CONCENTRATION PPM	26.9	36.0	95.5	24.7
HC MASS GRAMS	3.78	2.85	3.22	2.05
CO MASS GRAMS	11.56	8.34	9.42	5.29
CO2 MASS GRAMS	1269.4	1859.6	4880.0	1092.0
NOX MASS GRAMS	8.17	11.09	29.92	7.53
FUEL KG (LB)	.405 (.89)	.587 (1.29)	1.530 (3.37)	.345 (.76)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	3.84 (2.86)	1.74 (1.30)	.58 (.44)	2.19 (1.63)
BSCO G/KW HR (G/HP HR)	11.73 (8.75)	5.10 (3.81)	1.71 (1.27)	5.65 (4.22)
BSCO2 G/KW HR (G/HP HR)	1288.53 (960.86)	1138.40 (848.90)	885.38 (660.23)	1167.59 (870.67)
BSNOX G/KW HR (G/HP HR)	8.30 (6.19)	6.79 (5.06)	5.43 (4.05)	8.06 (6.01)
BSFC KG/KW HR (LB/HP HR)	.412 (.677)	.359 (.591)	.278 (.456)	.369 (.607)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)
BSHC G/KW HR (G/HP HR)	1.31 (.98)
BSCO G/KW HR (G/HP HR)	3.82 (2.85)
BSCO2 G/KW HR (G/HP HR)	1004. (749.)
BSNOX G/KW HR (G/HP HR)	6.26 (4.67)
BSFC KG/KW HR (LB/HP HR)	.316 (.520)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.735 (25.95)
MULTIPLIER FOR	G/TEST	.876
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0966 (.0720)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3053 (.1385)

20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN1
DATE 8/18/81
TIME 11:12
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.14 MM HG(29.10 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.2 GM/KG(85.1 GRAINS/LB)
NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	297.9	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5616.)	161.2 (5692.)	163.9 (5788.)	159.6 (5637.)
HC SAMPLE METER/RANGE/PPM	3.9/23/ 20.	5.1/23/ 25.	7.3/23/ 36.	5.3/23/ 27.
HC BCKGRD METER/RANGE/PPM	7.2/ 2/ 7.	6.9/ 2/ 7.	6.1/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	41.3/13/ 38.	45.1/13/ 42.	60.7/13/ 58.	34.9/13/ 32.
CO BCKGRD METER/RANGE/PPM	2.8/13/ 3.	2.5/13/ 2.	2.5/13/ 2.	2.4/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.8/ 3/ .42	38.2/ 3/ .64	89.8/ 3/ 1.67	26.0/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	3.7/13/ 11.	5.5/13/ 16.	14.5/13/ 43.	3.9/13/ 12.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	31.36	20.58	7.96	31.10
HC CONCENTRATION PPM	13.	19.	31.	21.
CO CONCENTRATION PPM	35.	39.	53.	29.
CO2 CONCENTRATION PCT	.38	.60	1.64	.38
NOX CONCENTRATION PPM	10.8	16.0	43.0	11.3
HC MASS GRAMS	1.17	1.76	2.93	1.94
CO MASS GRAMS	6.49	7.28	10.17	5.45
CO2 MASS GRAMS	1115.5	1781.6	4911.9	1121.1
NOX MASS GRAMS	3.29	4.95	13.50	3.46
FUEL KG (LB)	.352 (.78)	.561 (1.24)	1.540 (3.40)	.354 (.78)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.92 (1.24)
BSHC G/KW HR (G/HP HR)	1.19 (.88)	1.07 (.80)	.53 (.40)	2.10 (1.57)
BSCO G/KW HR (G/HP HR)	6.59 (4.91)	4.46 (3.32)	1.84 (1.38)	5.91 (4.40)
BSCO2 G/KW HR (G/HP HR)	1132.33 (844.38)	1090.64 (813.29)	891.18 (664.56)	1214.91 (905.96)
BSNOX G/KW HR (G/HP HR)	3.34 (2.49)	3.03 (2.26)	2.45 (1.83)	3.75 (2.80)
BSFC KG/KW HR (LB/HP HR)	.358 (.588)	.344 (.565)	.279 (.459)	.384 (.631)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.05 (12.14)
BSHC G/KW HR (G/HP HR)	.86 (.64)
BSCO G/KW HR (G/HP HR)	3.25 (2.42)
BSCO2 G/KW HR (G/HP HR)	986. (736.)
BSNOX G/KW HR (G/HP HR)	2.78 (2.07)
BSFC KG/KW HR (LB/HP HR)	.310 (.510)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.831 (29.36)
MULTIPLIER FOR	G/TEST	.774
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0855 (.0638)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2757 (.1251)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN2
DATE 8/18/81
TIME 11:52
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.63 MM HG(29.08 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.7 GM/KG(88.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3337.	3370.	3427.	3336.
TIME SECONDS	297.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	160.9 (5685.)	163.7 (5781.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	4.0/23/ 20.	5.3/23/ 26.	7.4/23/ 37.	5.4/23/ 27.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	6.4/ 2/ 6.	5.0/ 2/ 5.	4.9/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	41.0/13/ 38.	44.7/13/ 42.	60.1/13/ 58.	34.3/13/ 32.
CO BCKGRD METER/RANGE/PPM	1.9/13/ 2.	2.0/13/ 2.	1.8/13/ 2.	2.2/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.9/ 3/ .42	38.6/ 3/ .65	89.4/ 3/ 1.67	26.3/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	7.8/13/ 23.	11.5/13/ 34.	31.0/13/ 93.	8.2/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	31.24	20.35	8.00	30.73
HC CONCENTRATION PPM	14.	20.	33.	22.
CO CONCENTRATION PPM	36.	39.	53.	29.
CO2 CONCENTRATION PCT	.38	.61	1.63	.39
NOX CONCENTRATION PPM	23.2	34.2	92.9	24.4
HC MASS GRAMS	1.27	1.89	3.09	2.04
CO MASS GRAMS	6.59	7.28	10.15	5.37
CO2 MASS GRAMS	1114.5	1805.4	4876.3	1125.9
NOX MASS GRAMS	7.08	10.54	29.08	7.44
FUEL KG (LB)	.352 (.78)	.569 (1.25)	1.529 (3.37)	.356 (.78)
KW HR (HP HR)	.97 (1.30)	1.62 (2.17)	5.50 (7.37)	.97 (1.30)
BSHC G/KW HR (G/HP HR)	1.30 (.97)	1.16 (.87)	.56 (.42)	2.10 (1.56)
BSCO G/KW HR (G/HP HR)	6.78 (5.05)	4.49 (3.35)	1.84 (1.38)	5.52 (4.12)
BSCO2 G/KW HR (G/HP HR)	1145.82 (854.44)	1113.73 (830.51)	886.73 (661.23)	1157.59 (863.21)
BSNOX G/KW HR (G/HP HR)	7.28 (5.43)	6.50 (4.85)	5.29 (3.94)	7.64 (5.70)
BSFC KG/KW HR (LB/HP HR)	.362 (.595)	.351 (.577)	.278 (.457)	.366 (.602)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)
BSHC G/KW HR (G/HP HR)	.91 (.68)
BSCO G/KW HR (G/HP HR)	3.24 (2.42)
BSCO2 G/KW HR (G/HP HR)	984. (734.)
BSNOX G/KW HR (G/HP HR)	5.97 (4.45)
BSFC KG/KW HR (LB/HP HR)	.310 (.509)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.721 (25.45)
MULTIPLIER FOR	G/TEST	.893
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0985 (.0734)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3181 (.1443)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS- INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN3
DATE 8/18/81
TIME 12:32
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.38 MM HG(29.07 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.9 GM/KG(90.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5609.)	160.9 (5683.)	163.6 (5779.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	19.7/22/ 20.	27.0/22/ 27.	38.0/22/ 38.	28.0/22/ 28.
HC BCKGRD METER/RANGE/PPM	10.6/ 2/ 11.	8.0/ 2/ 8.	6.2/ 2/ 6.	6.1/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	39.5/13/ 37.	42.6/13/ 40.	60.8/13/ 58.	32.6/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.6/13/ 1.	1.6/13/ 1.	1.5/13/ 1.	1.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.4/ 3/ .43	37.6/ 3/ .63	90.2/ 3/ 1.68	25.7/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.1/ 3/ .05	3.4/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	7.4/13/ 22.	11.5/13/ 35.	30.6/13/ 92.	8.3/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	30.62	20.94	7.92	31.49
HC CONCENTRATION PPM	9.	17.	33.	22.
CO CONCENTRATION PPM	34.	37.	54.	28.
CO2 CONCENTRATION PCT	.39	.59	1.64	.37
NOX CONCENTRATION PPM	22.1	34.3	91.6	24.6
HC MASS GRAMS	.87	1.80	3.08	2.03
CO MASS GRAMS	6.35	6.96	10.32	5.17
CO2 MASS GRAMS	1127.3	1733.0	4904.7	1086.4
NOX MASS GRAMS	6.72	10.55	28.66	7.51
FUEL KG (LB)	.356 (.78)	.546 (1.20)	1.538 (3.39)	.344 (.76)
KW HR (HP HR)	.97 (1.30)	1.62 (2.17)	5.56 (7.46)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	.89 (.66)	1.11 (.83)	.55 (.41)	2.11 (1.57)
BSCO G/KW HR (G/HP HR)	6.53 (4.87)	4.30 (3.20)	1.85 (1.38)	5.38 (4.01)
BSCO2 G/KW HR (G/HP HR)	1158.95 (864.23)	1069.01 (797.16)	881.89 (657.63)	1131.46 (843.73)
BSNOX G/KW HR (G/HP HR)	6.91 (5.16)	6.51 (4.85)	5.15 (3.84)	7.82 (5.83)
BSFC KG/KW HR (LB/HP HR)	.366 (.601)	.337 (.554)	.277 (.455)	.358 (.588)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.12 (12.22)
BSHC G/KW HR (G/HP HR)	.85 (.64)
BSCO G/KW HR (G/HP HR)	3.16 (2.36)
BSCO2 G/KW HR (G/HP HR)	971. (724.)
BSNOX G/KW HR (G/HP HR)	5.86 (4.37)
BSFC KG/KW HR (LB/HP HR)	.305 (.502)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.719 (25.38)
MULTIPLIER FOR	G/TEST	.894
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0981 (.0731)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3212 (.1457)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN4
DATE 8/18/81
TIME 1:12
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 13.0 GM/KG(91.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3336.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.7 (5605.)	160.8 (5680.)	163.6 (5777.)	159.2 (5623.)
HC SAMPLE METER/RANGE/PPM	20.9/22/ 21.	26.8/22/ 27.	37.2/22/ 37.	27.0/22/ 27.
HC BCKGRD METER/RANGE/PPM	10.0/ 2/ 10.	9.8/ 2/ 10.	9.8/ 2/ 10.	8.0/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	39.8/13/ 37.	43.9/13/ 41.	61.4/13/ 59.	33.6/13/ 31.
CO BCKGRD METER/RANGE/PPM	1.3/13/ 1.	1.3/13/ 1.	1.3/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.0/ 3/ .43	38.7/ 3/ .65	91.9/ 3/ 1.72	26.1/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.6/13/ 23.	11.2/13/ 34.	30.6/13/ 92.	7.8/13/ 23.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	31.11	20.29	7.76	30.98
HC CONCENTRATION PPM	11.	17.	29.	19.
CO CONCENTRATION PPM	35.	39.	55.	29.
CO2 CONCENTRATION PCT	.39	.61	1.68	.39
NOX CONCENTRATION PPM	22.6	33.3	91.5	23.1
HC MASS GRAMS	1.02	1.62	2.70	1.77
CO MASS GRAMS	6.45	7.24	10.45	5.40
CO2 MASS GRAMS	1119.1	1805.3	5038.3	1127.9
NOX MASS GRAMS	6.87	10.23	28.62	7.04
FUEL KG (LB)	.353 (.78)	.568 (1.25)	1.580 (3.48)	.356 (.79)
KW HR (HP HR)	.99 (1.32)	1.62 (2.17)	5.56 (7.46)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.04 (.78)	1.00 (.75)	.49 (.36)	1.87 (1.39)
BSCO G/KW HR (G/HP HR)	6.54 (4.88)	4.47 (3.33)	1.88 (1.40)	5.70 (4.25)
BSCO2 G/KW HR (G/HP HR)	1135.98 (847.10)	1113.61 (830.42)	905.92 (675.54)	1190.12 (887.47)
BSNOX G/KW HR (G/HP HR)	6.97 (5.20)	6.31 (4.71)	5.15 (3.84)	7.43 (5.54)
BSFC KG/KW HR (LB/HP HR)	.359 (.590)	.351 (.576)	.284 (.467)	.376 (.618)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.12 (12.22)
BSHC G/KW HR (G/HP HR)	.78 (.58)
BSCO G/KW HR (G/HP HR)	3.24 (2.42)
BSCO2 G/KW HR (G/HP HR)	997. (744.)
BSNOX G/KW HR (G/HP HR)	5.79 (4.32)
BSFC KG/KW HR (LB/HP HR)	.314 (.515)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.710 (25.07)
MULTIPLIER FOR	G/TEST	.905
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0993 (.0740)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3166 (.1436)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6578-001

ENGINE NO.D31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN5
DATE 8/18/81
TIME 1:55
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-68. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 14.9 GM/KG(104.6 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.7 (5605.)	160.8 (5681.)	163.6 (5777.)	159.3 (5625.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	32.9/22/ 33.	46.7/22/ 47.	29.1/22/ 29.
HC BCKGRD METER/RANGE/PPM	7.6/ 2/ 8.	7.8/ 2/ 8.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	39.6/13/ 37.	42.2/13/ 39.	59.3/13/ 57.	33.2/13/ 31.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	1.0/13/ 1.	.9/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.0/ 3/ .43	38.0/ 3/ .64	89.3/ 3/ 1.66	25.9/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.9/13/ 24.	11.5/13/ 35.	30.6/13/ 92.	8.0/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.1/ 2/ 0.	.2/ 2/ 0.	.1/ 2/ 0.
DILUTION FACTOR	31.06	20.69	8.01	31.22
HC CONCENTRATION PPM	21.	25.	41.	22.
CO CONCENTRATION PPM	35.	37.	53.	29.
CO2 CONCENTRATION PCT	.39	.60	1.63	.38
NOX CONCENTRATION PPM	23.5	34.5	91.7	23.8
HC MASS GRAMS	1.89	2.36	3.83	2.05
CO MASS GRAMS	6.52	6.98	10.12	5.35
CO2 MASS GRAMS	1123.4	1767.1	4870.5	1118.0
NOX MASS GRAMS	7.15	10.61	28.71	7.24
FUEL KG (LB)	.356 (.78)	.557 (1.23)	1.528 (3.37)	.354 (.78)
KW HR (HP HR)	.96 (1.29)	1.62 (2.17)	5.52 (7.41)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.97 (1.47)	1.46 (1.09)	.69 (.52)	2.14 (1.60)
BSCO G/KW HR (G/HP HR)	6.79 (5.07)	4.31 (3.21)	1.83 (1.37)	5.57 (4.15)
BSCO2 G/KW HR (G/HP HR)	1170.01 (872.48)	1090.09 (812.88)	881.67 (657.46)	1164.39 (868.29)
BSNOX G/KW HR (G/HP HR)	7.44 (5.55)	6.54 (4.88)	5.20 (3.87)	7.54 (5.62)
BSFC KG/KW HR (LB/HP HR)	.370 (.609)	.344 (.565)	.277 (.455)	.368 (.605)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)
BSHC G/KW HR (G/HP HR)	1.12 (.83)
BSCO G/KW HR (G/HP HR)	3.20 (2.38)
BSCO2 G/KW HR (G/HP HR)	979. (730.)
BSNOX G/KW HR (G/HP HR)	5.92 (4.42)
BSFC KG/KW HR (LB/HP HR)	.308 (.507)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.715 (25.24)
MULTIPLIER FOR	G/TEST	.899
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0991 (.0739)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3216 (.1459)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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Reproduced from best available copy.

TABLE A-3. ENGINE EMISSION RESULTS- INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN6
DATE 8/18/81
TIME 2:38
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 13.4 GM/KG(93.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5608.)	160.9 (5682.)	163.6 (5778.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	26.4/22/ 26.	31.7/22/ 32.	44.4/22/ 44.	27.3/22/ 27.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.5/ 2/ 7.	6.3/ 2/ 6.	6.2/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	29.6/13/ 27.	41.5/13/ 39.	56.3/13/ 54.	32.0/13/ 29.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.4/13/ 0.	.4/13/ 0.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.9/ 3/ .37	38.6/ 3/ .65	90.3/ 3/ 1.68	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.9/13/ 24.	11.1/13/ 33.	30.0/13/ 90.	7.5/13/ 23.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	35.59	20.34	7.91	30.87
HC CONCENTRATION PPM	20.	26.	39.	21.
CO CONCENTRATION PPM	26.	37.	51.	28.
CO2 CONCENTRATION PCT	.33	.61	1.65	.39
NOX CONCENTRATION PPM	23.7	33.1	89.8	22.4
HC MASS GRAMS	1.80	2.37	3.67	1.96
CO MASS GRAMS	4.83	6.95	9.63	5.14
CO2 MASS GRAMS	954.1	1800.3	4938.9	1125.0
NOX MASS GRAMS	7.20	10.18	28.09	6.81
FUEL KG (LB)	.302 (.67)	.567 (1.25)	1.549 (3.42)	.355 (.78)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.82 (1.36)	1.45 (1.08)	.67 (.50)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	4.90 (3.66)	4.26 (3.17)	1.75 (1.30)	5.43 (4.05)
BSCO2 G/KW HR (G/HP HR)	968.50 (722.21)	1102.09 (821.82)	896.08 (668.21)	1187.08 (885.21)
BSNOX G/KW HR (G/HP HR)	7.30 (5.45)	6.23 (4.65)	5.10 (3.80)	7.19 (5.36)
BSFC KG/KW HR (LB/HP HR)	.306 (.504)	.347 (.571)	.281 (.462)	.375 (.617)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.08 (12.17)
BSHC G/KW HR (G/HP HR)	1.08 (.80)
BSCO G/KW HR (G/HP HR)	2.93 (2.18)
BSCO2 G/KW HR (G/HP HR)	971. (724.)
BSNOX G/KW HR (G/HP HR)	5.76 (4.29)
BSFC KG/KW HR (LB/HP HR)	.306 (.502)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.726 (25.63)
MULTIPLIER FOR	G/TEST	.886
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0976 (.0728)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3193 (.1448)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

ENGINE NO.D31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN7
DATE 8/18/81
TIME 3:20
DYNO NO. 5

PROJECT NO. 05-6598-001

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.6 GM/KG(88.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5608.)	160.9 (5682.)	163.6 (5778.)	159.3 (5626.)
HC SAMPLE METER/RANGE/PPM	27.1/22/ 27.	32.3/22/ 32.	45.6/22/ 46.	28.8/22/ 29.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	35.4/13/ 33.	42.5/13/ 40.	57.5/13/ 55.	33.1/13/ 31.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.9/13/ 1.	1.0/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.2/ 3/ .64	89.3/ 3/ 1.66	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.6/13/ 23.	11.2/13/ 34.	30.5/13/ 91.	7.6/13/ 23.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.
DILUTION FACTOR	31.61	20.57	8.01	30.85
HC CONCENTRATION PPM	21.	27.	40.	23.
CO CONCENTRATION PPM	31.	38.	51.	29.
CO2 CONCENTRATION PCT	.38	.61	1.63	.39
NOX CONCENTRATION PPM	22.7	33.5	91.0	22.4
HC MASS GRAMS	1.93	2.47	3.81	2.12
CO MASS GRAMS	5.78	7.05	9.77	5.33
CO2 MASS GRAMS	1108.0	1787.1	4875.8	1125.0
NOX MASS GRAMS	6.89	10.31	28.48	6.83
FUEL KG (LB)	.350 (.77)	.563 (1.24)	1.530 (3.37)	.356 (.78)
KW HR (HP HR)	.96 (1.29)	1.62 (2.17)	5.51 (7.39)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	2.01 (1.50)	1.52 (1.14)	.69 (.52)	2.21 (1.64)
BSCO G/KW HR (G/HP HR)	6.02 (4.49)	4.35 (3.25)	1.77 (1.32)	5.55 (4.14)
BSCO2 G/KW HR (G/HP HR)	1153.98 (860.52)	1102.40 (822.06)	884.63 (659.67)	1171.62 (873.67)
BSNOX G/KW HR (G/HP HR)	7.17 (5.35)	6.36 (4.74)	5.17 (3.85)	7.11 (5.30)
BSFC KG/KW HR (LB/HP HR)	.365 (.600)	.348 (.571)	.278 (.456)	.370 (.609)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.05 (12.14)
BSHC G/KW HR (G/HP HR)	1.14 (.85)
BSCO G/KW HR (G/HP HR)	3.09 (2.30)
BSCO2 G/KW HR (G/HP HR)	983. (733.)
BSNOX G/KW HR (G/HP HR)	5.80 (4.32)
BSFC KG/KW HR (LB/HP HR)	.309 (.508)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.711 (25.10)
MULTIPLIER FOR	G/TEST	.904
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0999 (.0745)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3230 (.1465)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN1
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.66 MM HG(29.16 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-73. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.3 (5627.)	161.4 (5702.)	164.2 (5798.)	159.8 (5646.)
HC SAMPLE METER/RANGE/PPM	61.7/22/ 62.	47.8/22/ 48.	51.6/22/ 52.	30.9/22/ 31.
HC BCKGRD METER/RANGE/PPM	7.9/ 2/ 8.	8.5/ 2/ 9.	8.4/ 2/ 8.	8.1/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	68.3/13/ 66.	48.4/13/ 46.	53.8/13/ 51.	30.9/13/ 28.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.6/13/ 1.	.6/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	29.4/ 3/ .48	40.9/ 3/ .69	91.6/ 3/ 1.71	26.0/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	3.0/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	7.1/13/ 21.	10.0/13/ 30.	27.6/13/ 83.	6.7/13/ 20.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	26.93	19.04	7.78	31.10
HC CONCENTRATION PPM	54.	40.	44.	23.
CO CONCENTRATION PPM	64.	43.	48.	27.
CO2 CONCENTRATION PCT	.44	.65	1.67	.38
NOX CONCENTRATION PPM	20.9	29.6	82.3	19.7
HC MASS GRAMS	4.97	3.70	4.19	2.13
CO MASS GRAMS	11.05	8.16	9.13	4.99
CO2 MASS GRAMS	1290.4	1933.2	5026.0	1105.4
NOX MASS GRAMS	6.38	9.15	25.86	6.03
FUEL KG (LB)	.413 (.91)	.611 (1.35)	1.577 (3.48)	.349 (.77)
KW HR (HP HR)	1.05 (1.40)	1.77 (2.37)	5.77 (7.74)	.99 (1.32)
BSHC G/KW HR (G/HP HR)	4.74 (3.54)	2.09 (1.56)	.73 (.54)	2.16 (1.61)
BSCO G/KW HR (G/HP HR)	11.31 (8.44)	4.61 (3.44)	1.58 (1.18)	5.06 (3.78)
BSCO2 G/KW HR (G/HP HR)	1231.93 (918.65)	1091.77 (814.13)	870.51 (649.14)	1122.14 (836.78)
BSNOX G/KW HR (G/HP HR)	6.09 (4.54)	5.17 (3.85)	4.48 (3.34)	6.13 (4.57)
BSFC KG/KW HR (LB/HP HR)	.395 (.649)	.345 (.567)	.273 (.449)	.355 (.583)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.58 (12.84)
BSHC G/KW HR (G/HP HR)	1.56 (1.17)
BSCO G/KW HR (G/HP HR)	3.56 (2.66)
BSCO2 G/KW HR (G/HP HR)	977. (728.)
BSNOX G/KW HR (G/HP HR)	4.95 (3.69)
BSFC KG/KW HR (LB/HP HR)	.308 (.506)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.776 (27.41)
MULTIPLIER FOR	G/TEST	.831
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0868 (.0647)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2816 (.1277)

20 X 20 FILTERS

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN1
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-59. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 12.3 GM/KG(86.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	161.5 (5704.)	164.2 (5800.)	159.9 (5648.)
HC SAMPLE METER/RANGE/PPM	28.1/22/ 28.	33.8/22/ 34.	45.5/22/ 45.	29.5/22/ 29.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.	8.0/ 2/ 8.	8.1/ 2/ 8.	8.1/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	35.6/13/ 33.	43.4/13/ 41.	56.1/13/ 53.	32.6/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.4/13/ 1.	1.7/13/ 2.	1.7/13/ 2.	1.8/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.3/ 3/ .65	89.5/ 3/ 1.67	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	3.0/ 3/ .05	2.9/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.6/13/ 23.	11.2/13/ 34.	30.4/13/ 91.	7.8/13/ 23.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.
DILUTION FACTOR	31.60	20.50	7.99	31.35
HC CONCENTRATION PPM	20.	26.	38.	22.
CO CONCENTRATION PPM	31.	38.	49.	28.
CO2 CONCENTRATION PCT	.38	.60	1.63	.38
NOX CONCENTRATION PPM	22.5	33.4	90.9	23.0
HC MASS GRAMS	1.05	2.44	3.64	2.00
CO MASS GRAMS	5.71	7.10	9.41	5.14
CO2 MASS GRAMS	1099.2	1782.1	4899.0	1117.5
NOX MASS GRAMS	6.85	10.32	28.55	7.03
FUEL KG (LB)	.348 (.77)	.562 (1.24)	1.537 (3.39)	.353 (.78)
KW HR (HP HR)	.97 (1.30)	1.66 (2.22)	5.62 (7.54)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.91 (1.42)	1.47 (1.10)	.65 (.48)	2.08 (1.55)
BSCO G/KW HR (G/HP HR)	5.87 (4.38)	4.28 (3.19)	1.67 (1.25)	5.35 (3.99)
BSCO2 G/KW HR (G/HP HR)	1130.11 (842.73)	1074.50 (801.25)	871.10 (649.58)	1163.81 (867.85)
BSNOX G/KW HR (G/HP HR)	7.05 (5.25)	6.22 (4.64)	5.08 (3.78)	7.32 (5.46)
BSFC KG/KW HR (LB/HP HR)	.357 (.588)	.339 (.557)	.273 (.449)	.368 (.605)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.22 (12.36)
BSHC G/KW HR (G/HP HR)	1.08 (.80)
BSCO G/KW HR (G/HP HR)	2.97 (2.21)
BSCO2 G/KW HR (G/HP HR)	966. (720.)
BSNOX G/KW HR (G/HP HR)	5.72 (4.27)
BSFC KG/KW HR (LB/HP HR)	.304 (.499)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.788 (27.83)
MULTIPLIER FOR	G/TEST	.819
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0888 (.0662)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2924 (.1326)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH [illegible] 466B
ENGINE [illegible] L(466. CID) I-6
CVS NO. [illegible]

TEST NO.D31-2 RUN2
DATE 8/19/81
TIME 12:04
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-72. PCT , CVS-61. PCT
ABSOLUTE HUMIDITY 13.3 GM/KG(93.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	161.[illegible] (5704.)	164.2 (5800.)	159.9 (5648.)
HC SAMPLE METER/RANGE/PPM	27.7/22/ 28.	33.4/22/ 33.	46.6/22/ 47.	30.0/22/ 30.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.	8.0/ 2/ 8.	7.5/ 2/ 8.	7.3/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	32.[illegible]/13/ 30.	42.1/13/ 39.	56.4/13/ 54.	32.3/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.3/13/ 1.	1.4/13/ 1.	1.8/13/ 2
CO2 SAMPLE METER/RANGE/PCT	24.1/ 3/ .39	38.3/ 3/ .65	88.5/ 3/ 1.65	[illegible]/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.6/13/ 23.	11.2/13/ 34.	30.6/13/ 92.	7.9/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	33.70	20.51	8.09	31.61
HC CONCENTRATION PPM	20.	26.	40.	23.
CO CONCENTRATION PPM	28.	37.	50.	27.
CO2 CONCENTRATION PCT	.35	.61	1.61	.38
NOX CONCENTRATION PPM	[illegible]	33.2	91.5	23.4
HC MASS GRAMS	1.82	2.40	3.79	2.11
CO MASS GRAMS	5.18	6.94	9.54	5.10
CO2 MASS GRAMS	1014.0	1790.7	4839.7	1107.2
NOX MASS GRAMS	6.88	10.25	28.75	7.15
FUEL KG (LB)	.321 (.71)	.565 (1.24)	1.518 (3.35)	.350 (.77)
KW HR (HP HR)	.96 (1.29)	1.65 (2.21)	5.60 (7.51)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.89 (1.41)	1.46 (1.09)	.68 (.50)	2.23 (1.66)
BSCO G/KW HR (G/HP HR)	5.40 (4.03)	4.22 (3.15)	1.70 (1.27)	5.38 (4.02)
BSCO2 G/KW HR (G/HP HR)	1056.09 (787.53)	1087.90 (811.25)	864.40 (644.58)	1168.26 (871.17)
BSNOX G/KW HR (G/HP HR)	7.17 (5.34)	6.23 (4.64)	5.13 (3.83)	7.54 (5.[illegible])
BSFC KG/KW HR (LB/HP HR)	.334 (.549)	.343 (.564)	.271 (.446)	.369 ([illegible])

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.15 (12.27)
BSHC G/KW HR (G/HP HR)	1.11 (.82)
BSCO G/KW HR (G/HP HR)	2.92 (2.18)
BSCO2 G/KW HR (G/HP HR)	956. (713.)
BSNOX G/KW HR (G/HP HR)	5.79 (4.32)
BSFC KG/KW HR (LB/HP HR)	.301 (.495)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.767 (27.11)
MULTIPLIER FOR	G/TEST	.840
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0918 (.0685)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3052 (.1384)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS- INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IN DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN3
DATE 8/19/81
TIME 12:48
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.90 MM HG(29.13 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-59. PCT , CVS-62. PCT
ABSOLUTE HUMIDITY 12.8 GM/KG(89.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.1 (5621.)	161.2 (5695.)	164.0 (5792.)	159.7 (5640.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	33.6/22/ 34.	46.5/22/ 47.	30.1/22/ 30.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	6.0/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	36.1/13/ 33.	42.6/13/ 40.	57.1/13/ 54.	32.0/13/ 29.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.	1.2/13/ 1.	1.2/13/ 1.	1.3/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.9/ 3/ .42	38.3/ 3/ .65	89.4/ 3/ 1.67	25.3/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	8.0/13/ 24.	11.7/13/ 35.	31.2/13/ 93.	8.2/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.8/ 2/ 1.	.2/ 2/ 0.
DILUTION FACTOR	31.21	20.51	8.00	32.00
HC CONCENTRATION PPM	21.	28.	41.	24.
CO CONCENTRATION PPM	32.	37.	51.	28.
CO2 CONCENTRATION PCT	.39	.61	1.63	.37
NOX CONCENTRATION PPM	23.7	34.8	92.8	24.5
HC MASS GRAMS	1.96	2.59	3.70	2.24
CO MASS GRAMS	5.05	7.04	9.68	5.12
CO2 MASS GRAMS	1125.9	1796.7	4893.5	1090.2
NOX MASS GRAMS	7.23	10.73	29.10	7.49
FUEL KG (LB)	.356 (.79)	.567 (1.25)	1.535 (3.38)	.345 (.76)
KW HR (HP HR)	.95 (1.27)	1.67 (2.24)	5.59 (7.49)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	2.07 (1.54)	1.55 (1.16)	.70 (.52)	2.33 (1.74)
BSCO G/KW HR (G/HP HR)	6.17 (4.60)	4.21 (3.14)	1.73 (1.29)	5.33 (3.98)
BSCO2 G/KW HR (G/HP HR)	1188.05 (885.93)	1075.26 (801.82)	875.95 (653.20)	1135.42 (846.68)
BSNOX G/KW HR (G/HP HR)	7.63 (5.69)	6.42 (4.79)	5.21 (3.88)	7.80 (5.82)
BSFC KG/KW HR (LB/HP HR)	.376 (.618)	.339 (.557)	.275 (.452)	.359 (.591)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.17 (12.29)
BSHC G/KW HR (G/HP HR)	1.17 (.87)
BSCO G/KW HR (G/HP HR)	3.02 (2.25)
BSCO2 G/KW HR (G/HP HR)	972. (725.)
BSNOX G/KW HR (G/HP HR)	5.95 (4.44)
BSFC KG/KW HR (LB/HP HR)	.306 (.503)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.756 (26.71)
MULTIPLIER FOR	G/TEST	.852
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0929 (.0693)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3038 (.1378)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN4
DATE 8/19/81
TIME 1:30
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.65 MM HG(29.12 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-61. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5616.)	161.2 (5693.)	163.9 (5790.)	159.6 (5638.)
HC SAMPLE METER/RANGE/PPM	27.1/22/ 27.	32.8/22/ 33.	45.0/22/ 45.	29.1/22/ 29.
HC BCKGRD METER/RANGE/PPM	7.6/ 2/ 8.	6.7/ 2/ 7.	6.5/ 2/ 7.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	34.1/13/ 31.	41.3/13/ 38.	53.5/13/ 51.	32.3/13/ 30.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.5/13/ 0.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.1/ 3/ .43	38.6/ 3/ .65	87.8/ 3/ 1.63	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.9/13/ 24.	11.6/13/ 35.	31.1/13/ 93.	8.0/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	30.98	20.34	8.16	30.85
HC CONCENTRATION PPM	20.	26.	39.	23.
CO CONCENTRATION PPM	30.	37.	48.	20.
CO2 CONCENTRATION PCT	.38	.61	1.59	.39
NOX CONCENTRATION PPM	23.5	34.7	92.9	23.9
HC MASS GRAMS	1.81	2.46	3.71	2.12
CO MASS GRAMS	5.56	6.88	9.12	5.20
CO2 MASS GRAMS	1117.8	1803.9	4786.9	1135.9
NOX MASS GRAMS	7.14	10.69	29.13	7.28
FUEL KG (LB)	.353 (.78)	.569 (1.25)	1.502 (3.31)	.359 (.79)
KW HR (HP HR)	.96 (1.29)	1.65 (2.21)	5.57 (7.47)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.89 (1.41)	1.49 (1.11)	.67 (.50)	2.24 (1.67)
BSCO G/KW HR (G/HP HR)	5.79 (4.32)	4.18 (3.12)	1.64 (1.22)	5.49 (4.09)
BSCO2 G/KW HR (G/HP HR)	1164.12 (868.08)	1095.89 (817.21)	858.78 (640.40)	1198.60 (893.80)
BSNOX G/KW HR (G/HP HR)	7.43 (5.54)	6.49 (4.84)	5.23 (3.90)	7.69 (5.73)
BSFC KG/KW HR (LB/HP HR)	.368 (.605)	.345 (.568)	.269 (.443)	.379 (.623)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.13 (12.24)
BSHC G/KW HR (G/HP HR)	1.11 (.83)
BSCO G/KW HR (G/HP HR)	2.93 (2.19)
BSCO2 G/KW HR (G/HP HR)	969. (723.)
BSNOX G/KW HR (G/HP HR)	5.94 (4.43)
BSFC KG/KW HR (LB/HP HR)	.305 (.501)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.768 (27.13)
MULTIPLIER FOR	G/TEST	.838
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0918 (.0685)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3011 (.1366)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN5
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 737.65 MM HG(29.12 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-68. PCT , CVS-53. PCT
ABSOLUTE HUMIDITY 13.5 GM/KG(94.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3337.	3370.	3427.	3337.
TIME SECONDS	297.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.7 (5640.)	161.3 (5696.)	164.0 (5792.)	159.7 (5640.)
HC SAMPLE METER/RANGE/PPM	27.7/22/ 28.	33.8/22/ 34.	46.3/22/ 46.	30.1/22/ 30.
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 6.	8.8/ 2/ 9.	8.1/ 2/ 8.	7.9/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	34.9/13/ 32.	42.7/13/ 40.	55.9/13/ 53.	31.8/13/ 29.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.6/13/ 1.	.6/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.7/ 3/ .42	38.4/ 3/ .65	89.3/ 3/ 1.66	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.6/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.9/13/ 24.	11.5/13/ 35.	30.9/13/ 93.	8.0/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	31.48	20.45	8.01	31.35
HC CONCENTRATION PPM	22.	25.	39.	22.
CO CONCENTRATION PPM	31.	38.	50.	28.
CO2 CONCENTRATION PCT	.38	.61	1.63	.38
NOX CONCENTRATION PPM	23.3	34.3	92.3	23.6
HC MASS GRAMS	2.03	2.36	3.71	2.06
CO MASS GRAMS	5.78	7.17	9.57	5.18
CO2 MASS GRAMS	1123.8	1802.3	4895.5	1124.6
NOX MASS GRAMS	7.11	10.58	28.97	7.21
FUEL KG (LB)	.355 (.78)	.568 (1.25)	1.536 (3.39)	.355 (.78)
KW HR (HP HR)	.97 (1.30)	1.67 (2.24)	5.59 (7.49)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	2.09 (1.56)	1.41 (1.05)	.66 (.49)	2.21 (1.65)
BSCO G/KW HR (G/HP HR)	5.95 (4.43)	4.29 (3.20)	1.71 (1.28)	5.54 (4.13)
BSCO2 G/KW HR (G/HP HR)	1155.41 (861.59)	1078.61 (804.32)	876.31 (653.47)	1202.44 (896.66)
BSNOX G/KW HR (G/HP HR)	7.31 (5.45)	6.33 (4.72)	5.18 (3.87)	7.71 (5.75)
BSFC KG/KW HR (LB/HP HR)	.365 (.601)	.340 (.559)	.275 (.452)	.380 (.625)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.17 (12.29)
BSHC G/KW HR (G/HP HR)	1.11 (.83)
BSCO G/KW HR (G/HP HR)	3.02 (2.25)
BSCO2 G/KW HR (G/HP HR)	976. (728.)
BSNOX G/KW HR (G/HP HR)	5.88 (4.38)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.763 (26.93)
MULTIPLIER FOR	G/TEST	.845
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0922 (.0688)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3003 (.1362)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS- INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN6
DATE 8/19/81
TIME 2:50
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.39 MM HG(29.11 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-56. PCT , CVS-59. PCT
ABSOLUTE HUMIDITY 12.7 GM/KG(88.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3369.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5617.)	161.1 (5689.)	163.9 (5788.)	159.6 (5636.)
HC SAMPLE METER/RANGE/PPM	29.2/22/ 29.	33.8/22/ 34.	45.9/22/ 46.	29.8/22/ 30.
HC BCKGRD METER/RANGE/PPM	8.6/ 2/ 9.	8.6/ 2/ 9.	8.8/ 2/ 9.	8.8/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	37.8/13/ 35.	43.9/13/ 41.	57.5/13/ 55.	32.9/13/ 30.
CO BCKGRD METER/RANGE/PPM	2.7/13/ 2.	3.1/13/ 3.	2.8/13/ 3.	2.5/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	26.2/ 3/ .43	38.1/ 3/ .64	89.6/ 3/ 1.67	25.2/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.8/13/ 23.	11.5/13/ 34.	30.6/13/ 92.	8.0/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.7/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	30.81	20.62	7.98	32.13
HC CONCENTRATION PPM	21.	26.	38.	21.
CO CONCENTRATION PPM	32.	37.	50.	27.
CO2 CONCENTRATION PCT	.39	.60	1.63	.37
NOX CONCENTRATION PPM	23.0	33.8	91.3	23.3
HC MASS GRAMS	1.91	2.38	3.61	1.96
CO MASS GRAMS	5.89	6.97	9.52	5.09
CO2 MASS GRAMS	1131.8	1775.3	4898.6	1080.0
NOX MASS GRAMS	7.00	10.43	28.62	7.10
FUEL KG (LB)	.358 (.79)	.560 (1.23)	1.537 (3.39)	.341 (.75)
KW HR (HP HR)	.96 (1.29)	1.66 (2.22)	5.57 (7.47)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.99 (1.49)	1.44 (1.07)	.65 (.48)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	6.14 (4.58)	4.20 (3.13)	1.71 (1.27)	5.37 (4.00)
BSCO2 G/KW HR (G/HP HR)	1178.71 (878.96)	1070.43 (798.22)	878.82 (655.34)	1139.54 (849.76)
BSNOX G/KW HR (G/HP HR)	7.29 (5.44)	6.29 (4.69)	5.13 (3.83)	7.50 (5.59)
BSFC KG/KW HR (LB/HP HR)	.373 (.613)	.337 (.555)	.276 (.453)	.360 (.592)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.14 (12.26)
BSHC G/KW HR (G/HP HR)	1.08 (.81)
BSCO G/KW HR (G/HP HR)	3.01 (2.24)
BSCO2 G/KW HR (G/HP HR)	972. (725.)
BSNOX G/KW HR (G/HP HR)	5.82 (4.34)
BSFC KG/KW HR (LB/HP HR)	.306 (.503)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.761 (26.87)
MULTIPLIER FOR	G/TEST	.846
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0925 (.0690)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3026 (.1372)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NOx
C-TRANS.

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN1
DATE 8/20/81
TIME
DYNO NO. 5

PROJECT NO. 05-6598-001

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 741.17 MM HG(29.18 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-71. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.9 GRAINS/LB)
NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	161.5 (5705.)	164.3 (5802.)	160.0 (5650.)
HC SAMPLE METER/RANGE/PPM	58.6/22/ 59.	46.3/22/ 46.	50.3/22/ 50.	29.7/22/ 30.
HC BCKGRD METER/RANGE/PPM	7.3/ 2/ 7.	7.1/ 2/ 7.	7.0/ 2/ 7.	6.8/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	67.6/13/ 66.	49.0/13/ 46.	56.0/13/ 53.	31.4/13/ 29.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.	1.1/13/ 1.	1.4/13/ 1.	1.5/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	28.8/ 3/ .47	39.8/ 3/ .67	89.4/ 3/ 1.67	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.1/ 3/ .05	3.0/ 3/ .05	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	8.9/13/ 27.	11.7/13/ 35.	31.5/13/ 95.	8.2/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	27.54	19.62	8.00	31.36
HC CONCENTRATION PPM	52.	40.	44.	23.
CO CONCENTRATION PPM	63.	44.	49.	27.
CO2 CONCENTRATION PCT	.43	.63	1.63	.38
NOX CONCENTRATION PPM	26.1	34.7	94.1	24.1
HC MASS GRAMS	4.74	3.69	4.19	2.13
CO MASS GRAMS	11.61	8.21	9.44	4.98
CO2 MASS GRAMS	1259.7	1860.7	4890.1	1104.7
NOX MASS GRAMS	7.95	10.71	29.57	7.37
FUEL KG (LB)	.403 (.89)	.588 (1.30)	1.535 (3.38)	.349 (.77)
KW HR (HP HR)	.99 (1.32)	1.65 (2.21)	5.64 (7.56)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	4.81 (3.59)	2.24 (1.67)	.74 (.55)	2.28 (1.70)
BSCO G/KW HR (G/HP HR)	11.79 (8.79)	4.99 (3.72)	1.67 (1.25)	5.33 (3.97)
BSCO2 G/KW HR (G/HP HR)	1278.72 (953.54)	1130.43 (842.96)	867.59 (646.96)	1181.16 (880.79)
BSNOX G/KW HR (G/HP HR)	8.07 (6.02)	6.51 (4.85)	5.25 (3.91)	7.88 (5.88)
BSFC KG/KW HR (LB/HP HR)	.410 (.673)	.357 (.588)	.272 (.448)	.373 (.614)

TOTAL TEST RESULTS 4 BAGS

TOTAL	KW HR (HP HR)	9.20 (12.34)
BSHC	G/KW HR (G/HP HR)	1.60 (1.19)
BSCO	G/KW HR (G/HP HR)	3.72 (2.77)
BSCO2	G/KW HR (G/HP HR)	990. (739.)
BSNOX	G/KW HR (G/HP HR)	6.04 (4.51)
BSFC	KG/KW HR (LB/HP HR)	.312 (.514)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.748 (26.43)
MULTIPLIER FOR	G/TEST	.862
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0937 (.0699)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2998 (.1360)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN1
DATE 8/20/81
TIME 10:20
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3369.	3427.	3343.
TIME SECONDS	296.0	299.9	305.0	297.5
TOTAL FLOW STD. CU. METRES(SCF)	159.5 (5633.)	161.6 (5706.)	164.3 (5804.)	160.3 (5662.)
HC SAMPLE METER/RANGE/PPM	26.8/22/ 27.	32.1/22/ 32.	44.8/22/ 45.	28.3/22/ 28.
HC BCKGRD METER/RANGE/PPM	6.6/ 2/ 7.	6.6/ 2/ 7.	6.6/ 2/ 7.	6.5/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	34.3/13/ 32.	41.6/13/ 39.	54.9/13/ 52.	30.1/13/ 28.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.2/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.1/ 3/ .64	88.0/ 3/ 1.64	24.9/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.9/ 3/ .04	2.9/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	7.9/13/ 24.	11.6/13/ 35.	31.4/13/ 94.	8.0/13/ 24.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	31.62	20.63	8.14	32.57
HC CONCENTRATION PPM	20.	26.	39.	22.
CO CONCENTRATION PPM	30.	36.	48.	26.
CO2 CONCENTRATION PCT	.38	.60	1.60	.36
NOX CONCENTRATION PPM	23.3	34.3	93.8	23.6
HC MASS GRAMS	1.88	2.41	3.70	2.03
CO MASS GRAMS	5.52	6.86	9.27	4.82
CO2 MASS GRAMS	1095.6	1776.2	4807.7	1069.7
NOX MASS GRAMS	7.10	10.61	29.49	7.23
FUEL KG (LB)	.346 (.76)	.560 (1.23)	1.508 (3.33)	.338 (.75)
KW HR (HP HR)	.97 (1.30)	1.66 (2.22)	5.61 (7.53)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.93 (1.44)	1.45 (1.08)	.66 (.49)	2.12 (1.58)
BSCO G/KW HR (G/HP HR)	5.67 (4.23)	4.13 (3.08)	1.65 (1.23)	5.02 (3.74)
BSCO2 G/KW HR (G/HP HR)	1126.43 (839.98)	1070.96 (798.62)	856.76 (638.89)	1114.04 (830.74)
BSNOX G/KW HR (G/HP HR)	7.30 (5.44)	6.40 (4.77)	5.26 (3.92)	7.53 (5.61)
BSFC KG/KW HR (LB/HP HR)	.356 (.586)	.338 (.555)	.269 (.442)	.352 (.579)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.20 (12.34)
BSHC G/KW HR (G/HP HR)	1.09 (.81)
BSCO G/KW HR (G/HP HR)	2.88 (2.14)
BSCO2 G/KW HR (G/HP HR)	951. (709.)
BSNOX G/KW HR (G/HP HR)	5.91 (4.41)
BSFC KG/KW HR (LB/HP HR)	.299 (.492)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.783 (27.66)
MULTIPLIER FOR	G/TEST	.825
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0896 (.0668)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2995 (.1359)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - INTEGRATED NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN2
DATE 8/20/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.41 MM HG(29.15 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-55. PCT , CVS-65. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(81.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.2 (5623.)	161.4 (5699.)	164.1 (5796.)	159.8 (5644.)
HC SAMPLE METER/RANGE/PPM	25.9/22/ 26.	31.2/22/ 31.	45.1/22/ 45.	28.0/22/ 28.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	34.7/13/ 32.	41.9/13/ 39.	57.2/13/ 55.	32.2/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	1.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.2/ 3/ .43	38.9/ 3/ .66	90.6/ 3/ 1.69	26.3/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	3.2/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	8.1/13/ 24.	11.9/13/ 36.	31.8/13/ 95.	8.3/13/ 25.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	30.86	20.17	7.88	30.74
HC CONCENTRATION PPM	19.	24.	39.	21.
CO CONCENTRATION PPM	30.	37.	51.	27.
CO2 CONCENTRATION PCT	.38	.61	1.65	.38
NOX CONCENTRATION PPM	24.1	35.4	94.8	24.5
HC MASS GRAMS	1.75	2.28	3.69	1.96
CO MASS GRAMS	5.58	6.91	9.68	5.11
CO2 MASS GRAMS	1111.3	1804.9	4952.7	1124.8
NOX MASS GRAMS	7.33	10.94	29.76	7.48
FUEL KG (LB)	.351 (.77)	.569 (1.25)	1.554 (3.43)	.355 (.78)
KW HR (HP HR)	.96 (1.29)	1.66 (2.22)	5.65 (7.58)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.83 (1.36)	1.37 (1.03)	.65 (.49)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	5.81 (4.34)	4.17 (3.11)	1.71 (1.28)	5.39 (4.02)
BSCO2 G/KW HR (G/HP HR)	1157.36 (863.04)	1088.28 (811.53)	876.76 (653.80)	1186.88 (885.05)
BSNOX G/KW HR (G/HP HR)	7.64 (5.70)	6.59 (4.92)	5.27 (3.93)	7.90 (5.89)
BSFC KG/KW HR (LB/HP HR)	.366 (.601)	.343 (.564)	.275 (.452)	.375 (.617)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.22 (12.36)
BSHC G/KW HR (G/HP HR)	1.05 (.78)
BSCO G/KW HR (G/HP HR)	2.96 (2.21)
BSCO2 G/KW HR (G/HP HR)	976. (728.)
BSNOX G/KW HR (G/HP HR)	6.02 (4.49)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.766 (27.05)
MULTIPLIER FOR	G/TEST	.842
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0913 (.0681)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2975 (.1349)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN1
DATE 8/18/81
TIME 10:30
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.14 MM HG(29.10 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-65. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.4 GM/KG(87.1 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.3 (119.0)	48.9 (120.0)	48.9 (120.0)	48.3 (119.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.1 (5619.)	161.1 (5689.)	163.8 (5785.)	159.6 (5637.)
HC SAMPLE METER/RANGE/PPM	9.6/23/ 48.	7.5/23/ 38.	8.1/23/ 40.	5.8/23/ 29.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	7.4/ 2/ 7.	7.2/ 2/ 7.	7.1/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	67.2/13/ 65.	49.8/13/ 47.	55.8/13/ 53.	33.6/13/ 31.
CO BCKGRD METER/RANGE/PPM	1.0/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	2.0/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	29.2/ 3/ .48	39.8/ 3/ .67	89.4/ 3/ 1.67	25.6/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.1/ 3/ .05	3.0/ 3/ .05	2.9/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	23.2/ 2/ 23.	29.3/ 2/ 29.	77.1/ 2/ 77.	20.2/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.2/ 2/ 0.
DILUTION FACTOR	27.21	19.64	8.00	31.61
HC CONCENTRATION PPM	41.	31.	34.	22.
CO CONCENTRATION PPM	62.	44.	49.	28.
CO2 CONCENTRATION PCT	.44	.63	1.63	.37
NOX CONCENTRATION PPM	22.9	29.0	76.6	20.0
HC MASS GRAMS	3.78	2.85	3.22	2.05
CO MASS GRAMS	11.56	8.34	9.42	5.29
CO2 MASS GRAMS	1269.4	1859.6	4880.0	1092.0
NOX MASS GRAMS	6.97	8.94	23.99	6.11
FUEL KG (LB)	.405 (.89)	.587 (1.29)	1.530 (3.37)	.345 (.76)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	3.84 (2.86)	1.74 (1.30)	.58 (.44)	2.19 (1.63)
BSCO G/KW HR (G/HP HR)	11.73 (8.75)	5.10 (3.81)	1.71 (1.27)	5.65 (4.22)
BSCO2 G/KW HR (G/HP HR)	1288.53 (960.86)	1138.40 (848.90)	885.38 (660.23)	1167.59 (870.67)
BSNOX G/KW HR (G/HP HR)	7.08 (5.28)	5.47 (4.08)	4.35 (3.25)	6.53 (4.87)
BSFC KG/KW HR (LB/HP HR)	.412 (.677)	.359 (.591)	.278 (.456)	.369 (.607)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)	
BSHC G/KW HR (G/HP HR)	1.31 (.98)	
BSCO G/KW HR (G/HP HR)	3.82 (2.85)	
BSCO2 G/KW HR (G/HP HR)	1004. (749.)	
BSNOX G/KW HR (G/HP HR)	5.08 (3.78)	(bag)
BSFC KG/KW HR (LB/HP HR)	.316 (.520)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.735 (25.95)
MULTIPLIER FOR	G/TEST	.876
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0966 (.0720)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3053 (.1385)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN1
DATE 8/18/81
TIME 11:12
DYNO NO. 5

PROJECT NO. 05-6598-001

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.14 MM HG(29.10 IN HG)
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.2 GM/KG(85.1 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5616.)	161.2 (5692.)	163.9 (5788.)	159.6 (5637.)
HC SAMPLE METER/RANGE/PPM	3.9/23/ 20.	5.1/23/ 25.	7.3/23/ 36.	5.3/23/ 27.
HC BCKGRD METER/RANGE/PPM	7.2/ 2/ 7.	6.9/ 2/ 7.	6.1/ 2/ 6.	5.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	41.3/13/ 38.	45.1/13/ 42.	60.7/13/ 58.	34.9/13/ 32.
CO BCKGRD METER/RANGE/PPM	2.8/13/ 3.	2.5/13/ 2.	2.5/13/ 2.	2.4/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.8/ 3/ .42	38.2/ 3/ .64	89.8/ 3/ 1.67	26.0/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	21.3/ 2/ 21.	29.9/ 2/ 30.	77.0/ 2/ 77.	20.4/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.4/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	31.36	20.58	7.96	31.10
HC CONCENTRATION PPM	13.	19.	31.	21.
CO CONCENTRATION PPM	35.	39.	53.	29.
CO2 CONCENTRATION PCT	.38	.60	1.64	.38
NOX CONCENTRATION PPM	21.0	29.5	76.6	20.1
HC MASS GRAMS	1.17	1.76	2.93	1.94
CO MASS GRAMS	6.49	7.28	10.17	5.45
CO2 MASS GRAMS	1115.5	1781.6	4911.9	1121.1
NOX MASS GRAMS	6.39	9.10	24.00	6.14
FUEL KG (LB)	.352 (.78)	.561 (1.24)	1.540 (3.40)	.354 (.78)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.92 (1.24)
BSHC G/KW HR (G/HP HR)	1.19 (.88)	1.07 (.80)	.53 (.40)	2.10 (1.57)
BSCO G/KW HR (G/HP HR)	6.59 (4.91)	4.46 (3.32)	1.84 (1.38)	5.91 (4.40)
BSCO2 G/KW HR (G/HP HR)	1132.33 (844.38)	1090.64 (813.29)	891.18 (664.56)	1214.91 (905.96)
BSNOX G/KW HR (G/HP HR)	6.49 (4.84)	5.57 (4.15)	4.35 (3.25)	6.65 (4.96)
BSFC KG/KW HR (LB/HP HR)	.358 (.588)	.344 (.565)	.279 (.459)	.384 (.631)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.05 (12.14)
BSHC G/KW HR (G/HP HR)	.86 (.64)
BSCO G/KW HR (G/HP HR)	3.25 (2.42)
BSCO2 G/KW HR (G/HP HR)	986. (736.)
BSNOX G/KW HR (G/HP HR)	5.04 (3.76) (bag)
BSFC KG/KW HR (LB/HP HR)	.310 (.510)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.831 (29.36)
MULTIPLIER FOR	G/TEST	.774
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0855 (.0638)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2757 (.1251)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IN DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN2
DATE 8/18/81
TIME 11:52
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.63 MM HG(29.08 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.7 GM/KG(88.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3337.	3370.	3427.	3336.
TIME SECONDS	297.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	160.9 (5685.)	163.7 (5781.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	4.0/23/ 20.	5.3/23/ 26.	7.4/23/ 37.	5.4/23/ 27.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	6.4/ 2/ 6.	5.0/ 2/ 5.	4.9/ 2/ 5.
CO SAMPLE METER/RANGE/PPM	41.0/13/ 38.	44.7/13/ 42.	60.1/13/ 58.	34.3/13/ 32.
CO BCKGRD METER/RANGE/PPM	1.9/13/ 2.	2.0/13/ 2.	1.8/13/ 2.	2.2/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.9/ 3/ .42	38.6/ 3/ .65	89.4/ 3/ 1.67	26.3/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	20.6/ 2/ 21.	29.3/ 2/ 29.	76.7/ 2/ 77.	20.5/ 2/ 21.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	31.24	20.35	8.00	30.73
HC CONCENTRATION PPM	14.	20.	33.	22.
CO CONCENTRATION PPM	36.	39.	53.	29.
CO2 CONCENTRATION PCT	.38	.61	1.63	.39
NOX CONCENTRATION PPM	20.4	29.1	76.5	20.3
HC MASS GRAMS	1.27	1.89	3.09	2.04
CO MASS GRAMS	6.59	7.28	10.15	5.37
CO2 MASS GRAMS	1114.5	1305.4	4876.3	1125.9
NOX MASS GRAMS	6.22	8.96	23.96	6.19
FUEL KG (LB)	.352 (.78)	.569 (1.25)	1.529 (3.37)	.356 (.78)
KW HR (HP HR)	.97 (1.30)	1.62 (2.17)	5.50 (7.37)	.97 (1.30)
BSHC G/KW HR (G/HP HR)	1.30 (.97)	1.16 (.87)	.56 (.42)	2.10 (1.56)
BSCO G/KW HR (G/HP HR)	6.78 (5.05)	4.49 (3.35)	1.84 (1.38)	5.52 (4.12)
BSCO2 G/KW HR (G/HP HR)	1145.82 (854.44)	1113.73 (830.51)	886.73 (661.23)	1157.59 (863.21)
BSNOX G/KW HR (G/HP HR)	6.40 (4.77)	5.53 (4.12)	4.36 (3.25)	6.36 (4.74)
BSFC KG/KW HR (LB/HP HR)	.362 (.595)	.351 (.577)	.278 (.457)	.366 (.602)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)	
BSHC G/KW HR (G/HP HR)	.91 (.68)	
BSCO G/KW HR (G/HP HR)	3.24 (2.42)	
BSCO2 G/KW HR (G/HP HR)	984. (734.)	
BSNOX G/KW HR (G/HP HR)	5.00 (3.73)	(bag)
BSFC KG/KW HR (LB/HP HR)	.310 (.509)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.721 (25.45)
MULTIPLIER FOR	G/TEST	.893
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0985 (.0734)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3181 (.1443)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D-31
ENGINE MODEL 81 IN DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN3
DATE 8/18/81
TIME 12:32
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.38 MM HG(29.07 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-57. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.9 GM/KG(90.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5607.)	160.9 (5683.)	163.6 (5779.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	19.6/22/ 20.	27.0/22/ 27.	38.0/22/ 38.	28.0/22/ 28.
HC BCKGRD METER/RANGE/PPM	10.6/ 2/ 11.	8.0/ 2/ 8.	6.2/ 2/ 6.	6.1/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	32.6/13/ 30.	42.6/13/ 40.	60.8/13/ 58.	32.6/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.6/13/ 1.	1.6/13/ 1.	1.5/13/ 1.	1.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.7/ 3/ .42	37.6/ 3/ .63	90.2/ 3/ 1.68	25.7/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	3.1/ 3/ .05	3.4/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	19.6/ 2/ 20.	27.8/ 2/ 28.	75.0/ 2/ 75.	19.6/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.	.4/ 2/ 0.
DILUTION FACTOR	31.55	20.94	7.92	31.49
HC CONCENTRATION PPM	9.	19.	33.	22.
CO CONCENTRATION PPM	28.	37.	54.	28.
CO2 CONCENTRATION PCT	.38	.59	1.64	.37
NOX CONCENTRATION PPM	19.4	27.5	74.7	19.2
HC MASS GRAMS	.86	1.80	3.08	2.03
CO MASS GRAMS	5.15	6.96	10.32	5.17
CO2 MASS GRAMS	1091.3	1732.9	4904.7	1086.4
NOX MASS GRAMS	5.89	8.47	23.36	5.86
FUEL KG (LB)	.344 (.76)	.546 (1.20)	1.538 (3.39)	.344 (.76)
KW HR (HP HR)	.97 (1.30)	1.62 (2.17)	5.56 (7.46)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	.88 (.66)	1.11 (.83)	.55 (.41)	2.11 (1.57)
BSCO G/KW HR (G/HP HR)	5.30 (3.95)	4.30 (3.20)	1.85 (1.38)	5.38 (4.01)
BSCO2 G/KW HR (G/HP HR)	1121.95 (836.64)	1069.00 (797.16)	881.89 (657.63)	1131.45 (843.73)
BSNOX G/KW HR (G/HP HR)	6.06 (4.52)	5.22 (3.90)	4.20 (3.13)	6.10 (4.55)
BSFC KG/KW HR (LB/HP HR)	.354 (.581)	.337 (.554)	.277 (.455)	.358 (.588)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.12 (12.22)
BSHC G/KW HR (G/HP HR)	.85 (.64)
BSCO G/KW HR (G/HP HR)	3.03 (2.26)
BSCO2 G/KW HR (G/HP HR)	967. (721.)
BSNOX G/KW HR (G/HP HR)	4.78 (3.57) (bag)
BSFC KG/KW HR (LB/HP HR)	.304 (.500)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.717 (25.33)
MULTIPLIER FOR	G/TEST	.896
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0983 (.0733)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3232 (.1466)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN4
DATE 8/18/81
TIME 1:12
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-64. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 13.0 GM/KG(91.2 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3336.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.7 (5605.)	160.8 (5680.)	163.6 (5777.)	159.2 (5623.)
HC SAMPLE METER/RANGE/PPM	20.9/22/ 21.	26.8/22/ 27.	37.2/22/ 37.	27.0/22/ 27.
HC BCKGRD METER/RANGE/PPM	10.0/ 2/ 10.	9.8/ 2/ 10.	9.8/ 2/ 10.	8.0/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	39.8/13/ 37.	43.9/13/ 41.	61.4/13/ 59.	33.6/13/ 31.
CO BCKGRD METER/RANGE/PPM	1.3/13/ 1.	1.3/13/ 1.	1.3/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.0/ 3/ .43	38.7/ 3/ .65	91.9/ 3/ 1.72	26.1/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.4/ 2/ 20.	29.2/ 2/ 29.	78.5/ 2/ 79.	20.5/ 2/ 21.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	31.11	20.29	7.76	30.98
HC CONCENTRATION PPM	11.	17.	29.	19.
CO CONCENTRATION PPM	35.	39.	55.	29.
CO2 CONCENTRATION PCT	.39	.61	1.68	.39
NOX CONCENTRATION PPM	20.1	28.9	78.1	20.2
HC MASS GRAMS	1.02	1.62	2.70	1.77
CO MASS GRAMS	6.45	7.24	10.45	5.40
CO2 MASS GRAMS	1119.1	1805.3	5038.3	1127.9
NOX MASS GRAMS	6.10	8.90	24.42	6.15
FUEL KG (LB)	.353 (.78)	.568 (1.25)	1.580 (3.48)	.356 (.79)
KW HR (HP HR)	.99 (1.32)	1.62 (2.17)	5.56 (7.46)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.04 (.78)	1.00 (.75)	.49 (.36)	1.87 (1.39)
BSCO G/KW HR (G/HP HR)	6.54 (4.88)	4.47 (3.33)	1.88 (1.40)	5.70 (4.25)
BSCO2 G/KW HR (G/HP HR)	1135.98 (847.10)	1113.61 (830.42)	905.92 (675.54)	1190.12 (887.47)
BSNOX G/KW HR (G/HP HR)	6.20 (4.62)	5.49 (4.09)	4.39 (3.27)	6.49 (4.84)
BSFC KG/KW HR (LB/HP HR)	.359 (.590)	.351 (.576)	.284 (.467)	.376 (.618)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.12 (12.22)
BSHC G/KW HR (G/HP HR)	.78 (.58)
BSCO G/KW HR (G/HP HR)	3.24 (2.42)
BSCO2 G/KW HR (G/HP HR)	997. (744.)
BSNOX G/KW HR (G/HP HR)	5.00 (3.73)(bag)
BSFC KG/KW HR (LB/HP HR)	.314 (.515)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.710 (25.07)
MULTIPLIER FOR	G/TEST	.905
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0993 (.0740)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3166 (.1436)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUNS
DATE 8/18/81
TIME 1:55
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-68. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 14.7 GM/KG(104.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.7 (5605.)	160.8 (5681.)	163.6 (5777.)	159.3 (5625.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	32.9/22/ 33.	46.7/22/ 47.	29.1/22/ 29.
HC BCKGRD METER/RANGE/PPM	7.6/ 2/ 8.	7.8/ 2/ 8.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	39.6/13/ 37.	42.2/13/ 39.	59.3/13/ 57.	33.2/13/ 31.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.	1.0/13/ 1.	.9/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.0/ 3/ .43	38.0/ 3/ .64	89.3/ 3/ 1.66	25.9/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.6/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.2/ 2/ 20.	28.9/ 2/ 29.	75.5/ 2/ 76.	20.3/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.1/ 2/ 0.	.2/ 2/ 0.	.1/ 2/ 0.
DILUTION FACTOR	31.06	20.69	8.01	31.22
HC CONCENTRATION PPM	21.	25.	41.	22.
CO CONCENTRATION PPM	35.	37.	53.	29.
CO2 CONCENTRATION PCT	.39	.60	1.63	.38
NOX CONCENTRATION PPM	20.1	28.8	75.3	20.2
HC MASS GRAMS	1.89	2.36	3.83	2.05
CO MASS GRAMS	6.52	6.90	10.12	5.35
CO2 MASS GRAMS	1123.4	1767.1	4870.5	1118.0
NOX MASS GRAMS	6.10	8.06	23.57	6.15
FUEL KG (LB)	.356 (.78)	.557 (1.23)	1.528 (3.37)	.354 (.78)
KW HR (HP HR)	.96 (1.29)	1.62 (2.17)	5.52 (7.41)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.97 (1.47)	1.46 (1.09)	.69 (.52)	2.14 (1.60)
BSCO G/KW HR (G/HP HR)	6.79 (5.07)	4.31 (3.21)	1.83 (1.37)	5.57 (4.15)
BSCO2 G/KW HR (G/HP HR)	1170.01 (872.48)	1090.09 (812.88)	881.67 (657.46)	1164.39 (868.29)
BSNOX G/KW HR (G/HP HR)	6.36 (4.74)	5.47 (4.08)	4.27 (3.18)	6.41 (4.78)
BSFC KG/KW HR (LB/HP HR)	.370 (.609)	.344 (.565)	.277 (.455)	.368 (.605)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.07 (12.16)	
BSHC G/KW HR (G/HP HR)	1.12 (.83)	
BSCO G/KW HR (G/HP HR)	3.20 (2.38)	
BSCO2 G/KW HR (G/HP HR)	979. (730.)	
BSNOX G/KW HR (G/HP HR)	4.93 (3.68)	(bag)
BSFC KG/KW HR (LB/HP HR)	.308 (.507)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.715 (25.24)
MULTIPLIER FOR	G/TEST	.899
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0991 (.0739)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3216 (.1459)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IN DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN6
DATE 8/18/81
TIME 2:38
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-63. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 13.4 GM/KG(93.6 GRAINS/LB)   NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	296.9
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5608.)	160.9 (5682.)	163.6 (5778.)	159.3 (5627.)
HC SAMPLE METER/RANGE/PPM	26.4/22/ 26.	31.7/22/ 32.	44.4/22/ 44.	27.3/22/ 27.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	6.5/ 2/ 7.	6.3/ 2/ 6.	6.2/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	29.6/13/ 27.	41.5/13/ 39.	56.3/13/ 54.	32.0/13/ 29.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.4/13/ 0.	.4/13/ 0.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	22.9/ 3/ .37	38.6/ 3/ .65	90.3/ 3/ 1.68	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	17.7/ 2/ 18.	28.8/ 2/ 29.	76.8/ 2/ 77.	20.3/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	35.59	20.34	7.91	30.87
HC CONCENTRATION PPM	20.	26.	39.	21.
CO CONCENTRATION PPM	26.	37.	51.	28.
CO2 CONCENTRATION PCT	.33	.61	1.65	.39
NOX CONCENTRATION PPM	17.6	28.6	76.6	20.1
HC MASS GRAMS	1.80	2.37	3.67	1.96
CO MASS GRAMS	4.83	6.95	9.63	5.14
CO2 MASS GRAMS	954.1	1800.3	4938.9	1125.0
NOX MASS GRAMS	5.35	8.80	23.98	6.13
FUEL KG (LB)	.302 (.67)	.567 (1.25)	1.549 (3.42)	.355 (.78)
KW HR (HP HR)	.99 (1.32)	1.63 (2.19)	5.51 (7.39)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.82 (1.36)	1.45 (1.08)	.67 (.50)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	4.90 (3.66)	4.26 (3.17)	1.75 (1.30)	5.43 (4.05)
BSCO2 G/KW HR (G/HP HR)	968.50 (722.21)	1102.09 (821.82)	896.08 (668.21)	1187.08 (885.21)
BSNOX G/KW HR (G/HP HR)	5.43 (4.05)	5.39 (4.02)	4.35 (3.24)	6.47 (4.82)
BSFC KG/KW HR (LB/HP HR)	.306 (.504)	.347 (.571)	.281 (.462)	.375 (.617)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.08 (12.17)
BSHC G/KW HR (G/HP HR)	1.08 (.80)
BSCO G/KW HR (G/HP HR)	2.93 (2.18)
BSCO2 G/KW HR (G/HP HR)	971. (724.)
BSNOX G/KW HR (G/HP HR)	4.88 (3.64)(bag)
BSFC KG/KW HR (LB/HP HR)	.306 (.502)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.726 (25.63)
MULTIPLIER FOR	G/TEST	.886
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0976 (.0728)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3193 (.1448)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D31
ENGINE MODEL 81 IH DT1-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-1 RUN7
DATE 8/18/81
TIME 3:20
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 738.12 MM HG(29.06 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-60. PCT , CVS-60. PCT
ABSOLUTE HUMIDITY 12.6 GM/KG(88.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)	162.6 (6.4)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	158.8 (5608.)	160.9 (5682.)	163.6 (5778.)	159.3 (5626.)
HC SAMPLE METER/RANGE/PPM	27.1/22/ 27.	32.3/22/ 32.	45.6/22/ 46.	28.8/22/ 29.
HC BCKGRD METER/RANGE/PPM	6.3/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	35.4/13/ 33.	42.5/13/ 40.	57.5/13/ 55.	33.1/13/ 31.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.9/13/ 1.	1.0/13/ 1.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.2/ 3/ .64	89.3/ 3/ 1.66	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.9/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.8/ 2/ 21.	29.0/ 2/ 29.	76.4/ 2/ 76.	20.3/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.
DILUTION FACTOR	31.61	20.57	8.01	30.85
HC CONCENTRATION PPM	21.	27.	40.	23.
CO CONCENTRATION PPM	31.	38.	51.	29.
CO2 CONCENTRATION PCT	.38	.61	1.63	.39
NOX CONCENTRATION PPM	20.7	28.8	76.0	20.0
HC MASS GRAMS	1.93	2.47	3.81	2.12
CO MASS GRAMS	5.78	7.05	9.77	5.33
CO2 MASS GRAMS	1108.0	1787.1	4875.8	1125.0
NOX MASS GRAMS	6.29	8.87	23.80	6.10
FUEL KG (LB)	.350 (.77)	.563 (1.24)	1.530 (3.37)	.356 (.78)
KW HR (HP HR)	.96 (1.29)	1.62 (2.17)	5.51 (7.39)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	2.01 (1.50)	1.52 (1.14)	.69 (.52)	2.21 (1.64)
BSCO G/KW HR (G/HP HR)	6.02 (4.49)	4.35 (3.25)	1.77 (1.32)	5.55 (4.14)
BSCO2 G/KW HR (G/HP HR)	1153.98 (860.52)	1102.40 (822.06)	884.63 (659.67)	1171.62 (873.67)
BSNOX G/KW HR (G/HP HR)	6.55 (4.88)	5.47 (4.08)	4.32 (3.22)	6.35 (4.74)
BSFC KG/KW HR (LB/HP HR)	.365 (.600)	.348 (.571)	.278 (.456)	.370 (.609)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.05 (12.14)
BSHC G/KW HR (G/HP HR)	1.14 (.85)
BSCO G/KW HR (G/HP HR)	3.09 (2.30)
BSCO2 G/KW HR (G/HP HR)	983. (733.)
BSNOX G/KW HR (G/HP HR)	4.98 (3.71) (bag)
BSFC KG/KW HR (LB/HP HR)	.309 (.508)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.711 (25.10)
MULTIPLIER FOR	G/TEST	.904
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0999 (.0745)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3230 (.1465)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN1
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.66 MM HG(29.16 IN HG)
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)

RELATIVE HUMIDITY , ENGINE-73. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.3 (5627.)	161.4 (5702.)	164.2 (5798.)	159.8 (5646.)
HC SAMPLE METER/RANGE/PPM	61.7/22/ 62.	47.8/22/ 48.	51.6/22/ 52.	30.9/22/ 31.
HC BCKGRD METER/RANGE/PPM	7.9/ 2/ 8.	8.5/ 2/ 9.	8.4/ 2/ 8.	8.1/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	68.3/13/ 66.	48.4/13/ 46.	53.8/13/ 51.	30.9/13/ 28.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.6/13/ 1.	.6/13/ 1.	.9/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	29.4/ 3/ .48	40.9/ 3/ .69	91.6/ 3/ 1.71	26.0/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	3.0/ 3/ .05	3.2/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	22.3/ 2/ 22.	29.7/ 2/ 30.	80.0/ 2/ 80.	20.6/ 2/ 21.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	26.93	19.04	7.78	31.10
HC CONCENTRATION PPM	54.	40.	44.	23.
CO CONCENTRATION PPM	64.	43.	48.	27.
CO2 CONCENTRATION PCT	.44	.65	1.67	.38
NOX CONCENTRATION PPM	21.9	29.2	79.5	20.1
HC MASS GRAMS	4.97	3.70	4.19	2.13
CO MASS GRAMS	11.85	8.16	9.13	4.99
CO2 MASS GRAMS	1290.4	1933.2	5026.0	1105.4
NOX MASS GRAMS	6.68	9.03	24.96	6.15
FUEL KG (LB)	.413 (.91)	.611 (1.35)	1.577 (3.48)	.349 (.77)
KW HR (HP HR)	1.05 (1.40)	1.77 (2.37)	5.77 (7.74)	.99 (1.32)
BSHC G/KW HR (G/HP HR)	4.74 (3.54)	2.09 (1.56)	.73 (.54)	2.16 (1.61)
BSCO G/KW HR (G/HP HR)	11.31 (8.44)	4.61 (3.44)	1.58 (1.18)	5.06 (3.78)
BSCO2 G/KW HR (G/HP HR)	1231.93 (918.65)	1091.77 (814.13)	870.51 (649.14)	1122.14 (836.78)
BSNOX G/KW HR (G/HP HR)	6.38 (4.75)	5.10 (3.80)	4.32 (3.22)	6.24 (4.66)
BSFC KG/KW HR (LB/HP HR)	.395 (.649)	.345 (.567)	.273 (.449)	.355 (.583)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.58 (12.84)	
BSHC G/KW HR (G/HP HR)	1.56 (1.17)	
BSCO G/KW HR (G/HP HR)	3.56 (2.66)	
BSCO2 G/KW HR (G/HP HR)	977. (728.)	
BSNOX G/KW HR (G/HP HR)	4.89 (3.65)	(bag)
BSFC KG/KW HR (LB/HP HR)	.308 (.506)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.776 (27.41)
MULTIPLIER FOR	G/TEST	.831
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0868 (.0647)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2816 (.1277)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN1
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-59. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 12.3 GM/KG(86.4 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	161.5 (5704.)	164.2 (5800.)	159.9 (5648.)
HC SAMPLE METER/RANGE/PPM	28.1/22/ 28.	33.8/22/ 34.	45.5/22/ 45.	29.5/22/ 29.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.	8.0/ 2/ 8.	8.1/ 2/ 8.	8.1/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	35.6/13/ 33.	43.4/13/ 41.	56.1/13/ 53.	32.6/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.4/13/ 1.	1.7/13/ 2.	1.7/13/ 2.	1.8/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.3/ 3/ .65	89.5/ 3/ 1.67	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.8/ 3/ .04	3.0/ 3/ .05	2.9/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	19.6/ 2/ 20.	28.9/ 2/ 29.	76.6/ 2/ 77.	20.2/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.
DILUTION FACTOR	31.60	20.50	7.99	31.35
HC CONCENTRATION PPM	20.	26.	38.	22.
CO CONCENTRATION PPM	31.	38.	49.	28.
CO2 CONCENTRATION PCT	.38	.60	1.63	.38
NOX CONCENTRATION PPM	19.3	28.6	76.3	19.9
HC MASS GRAMS	1.85	2.44	3.64	2.00
CO MASS GRAMS	5.71	7.10	9.41	5.14
CO2 MASS GRAMS	1099.2	1782.1	4899.0	1117.5
NOX MASS GRAMS	5.89	8.84	23.95	6.09
FUEL KG (LB)	.348 (.77)	.562 (1.24)	1.537 (3.39)	.353 (.78)
KW HR (HP HR)	.97 (1.30)	1.66 (2.22)	5.62 (7.54)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.91 (1.42)	1.47 (1.10)	.65 (.48)	2.08 (1.55)
BSCO G/KW HR (G/HP HR)	5.87 (4.38)	4.28 (3.19)	1.67 (1.25)	5.35 (3.99)
BSCO2 G/KW HR (G/HP HR)	1130.11 (842.73)	1074.50 (801.25)	871.10 (649.58)	1163.81 (867.85)
BSNOX G/KW HR (G/HP HR)	6.05 (4.51)	5.33 (3.97)	4.26 (3.18)	6.34 (4.73)
BSFC KG/KW HR (LB/HP HR)	.357 (.588)	.339 (.557)	.273 (.449)	.368 (.605)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.22 (12.36)	
BSHC G/KW HR (G/HP HR)	1.08 (.80)	
BSCO G/KW HR (G/HP HR)	2.97 (2.21)	
BSCO2 G/KW HR (G/HP HR)	966. (720.)	
BSNOX G/KW HR (G/HP HR)	4.86 (3.62)	(bag)
BSFC KG/KW HR (LB/HP HR)	.304 (.499)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.788 (27.83)
MULTIPLIER FOR	G/TEST	.819
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0888 (.0662)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2924 (.1326)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) L-6
CVS NO. 10

TEST NO.D31-2 RUN2
DATE 8/19/81
TIME 12:04
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.92 MM HG(29.17 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-72. PCT , CVS-61. PCT
ABSOLUTE HUMIDITY 13.3 GM/KG(93.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.4 (5629.)	161.5 (5704.)	164.2 (5800.)	159.9 (5648.)
HC SAMPLE METER/RANGE/PPM	27.7/22/ 28.	33.4/22/ 33.	46.6/22/ 47.	30.0/22/ 30.
HC BCKGRD METER/RANGE/PPM	8.2/ 2/ 8.	8.0/ 2/ 8.	7.5/ 2/ 8.	7.3/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	32.2/13/ 30.	42.1/13/ 39.	56.4/13/ 54.	32.3/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.3/13/ 1.	1.4/13/ 1.	1.8/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	24.1/ 3/ .39	38.3/ 3/ .65	88.5/ 3/ 1.65	25.6/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	3.0/ 3/ .05	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	18.1/ 2/ 18.	27.8/ 2/ 28.	73.4/ 2/ 73.	19.4/ 2/ 19.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.4/ 2/ 0.	.3/ 2/ 0.	.2/ 2/ 0.
DILUTION FACTOR	33.70	20.51	8.09	31.61
HC CONCENTRATION PPM	20.	26.	40.	23.
CO CONCENTRATION PPM	28.	37.	50.	27.
CO2 CONCENTRATION PCT	.35	.61	1.61	.38
NOX CONCENTRATION PPM	17.9	27.4	73.1	19.2
HC MASS GRAMS	1.82	2.40	3.79	2.11
CO MASS GRAMS	5.17	6.94	9.54	5.10
CO2 MASS GRAMS	1014.0	1790.7	4839.7	1107.2
NOX MASS GRAMS	5.46	8.47	22.98	5.87
FUEL KG (LB)	.321 (.71)	.565 (1.24)	1.518 (3.35)	.350 (.77)
KW HR (HP HR)	.96 (1.29)	1.65 (2.21)	5.60 (7.51)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.89 (1.41)	1.46 (1.09)	.68 (.50)	2.23 (1.66)
BSCO G/KW HR (G/HP HR)	5.38 (4.01)	4.22 (3.15)	1.70 (1.27)	5.38 (4.02)
BSCO2 G/KW HR (G/HP HR)	1056.09 (787.53)	1087.90 (811.25)	864.40 (644.58)	1168.26 (871.17)
BSNOX G/KW HR (G/HP HR)	5.69 (4.24)	5.15 (3.84)	4.10 (3.06)	6.20 (4.62)
BSFC KG/KW HR (LB/HP HR)	.334 (.549)	.343 (.564)	.271 (.446)	.369 (.607)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.15 (12.27)
BSHC G/KW HR (G/HP HR)	1.11 (.82)
BSCO G/KW HR (G/HP HR)	2.92 (2.18)
BSCO2 G/KW HR (G/HP HR)	956. (713.)
BSNOX G/KW HR (G/HP HR)	4.67 (3.49) (bag)
BSFC KG/KW HR (LB/HP HR)	.301 (.495)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.767 (27.11)
MULTIPLIER FOR	G/TEST	.840
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0918 (.0685)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3052 (.1384)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI 466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN3
DATE 8/19/81
TIME 12:48
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.90 MM HG(29.13 IN HG)
DRY BULB TEMP. 26.1 DEG C(79.0 DEG F)

RELATIVE HUMIDITY , ENGINE-59. PCT , CVS-62. PCT
ABSOLUTE HUMIDITY 12.8 GM/KG(89.5 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.1 (5621.)	161.2 (5695.)	164.0 (5792.)	157.7 (5640.)
HC SAMPLE METER/RANGE/PPM	28.0/22/ 28.	33.6/22/ 34.	46.5/22/ 47.	30.1/22/ 30.
HC BCKGRD METER/RANGE/PPM	6.9/ 2/ 7.	6.0/ 2/ 6.	6.0/ 2/ 6.	6.0/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	36.1/13/ 33.	42.6/13/ 40.	57.1/13/ 54.	32.0/13/ 29.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.	1.2/13/ 1.	1.2/13/ 1.	1.3/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.9/ 3/ .42	38.3/ 3/ .65	89.4/ 3/ 1.67	25.3/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.5/ 3/ .04	2.6/ 3/ .04	2.7/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.3/ 2/ 20.	28.6/ 2/ 29.	75.7/ 2/ 76.	19.4/ 2/ 19.
NOX BCKGRD METER/RANGE/PPM	.2/ 2/ 0.	.2/ 2/ 0.	.8/ 2/ 1.	.2/ 2/ 0.
DILUTION FACTOR	31.21	20.51	8.00	32.00
HC CONCENTRATION PPM	21.	28.	41.	24.
CO CONCENTRATION PPM	32.	37.	51.	28.
CO2 CONCENTRATION PCT	.39	.61	1.63	.37
NOX CONCENTRATION PPM	20.1	28.4	75.0	19.2
HC MASS GRAMS	1.96	2.59	3.90	2.24
CO MASS GRAMS	5.85	7.04	9.68	5.12
CO2 MASS GRAMS	1125.9	1796.7	4893.5	1090.2
NOX MASS GRAMS	6.12	8.76	23.53	5.87
FUEL KG (LB)	.356 (.79)	.567 (1.25)	1.535 (3.38)	.345 (.76)
KW HR (HP HR)	.95 (1.27)	1.67 (2.24)	5.59 (7.49)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	2.07 (1.54)	1.55 (1.16)	.70 (.52)	2.33 (1.74)
BSCO G/KW HR (G/HP HR)	6.17 (4.60)	4.21 (3.14)	1.73 (1.29)	5.33 (3.98)
BSCO2 G/KW HR (G/HP HR)	1188.05 (885.93)	1075.26 (801.82)	875.95 (653.20)	1135.42 (846.68)
BSNOX G/KW HR (G/HP HR)	6.46 (4.82)	5.24 (3.91)	4.21 (3.14)	6.11 (4.56)
BSFC KG/KW HR (LB/HP HR)	.376 (.618)	.339 (.557)	.275 (.452)	.359 (.591)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.17 (12.29)
BSHC G/KW HR (G/HP HR)	1.17 (.87)
BSCO G/KW HR (G/HP HR)	3.02 (2.25)
BSCO2 G/KW HR (G/HP HR)	972. (725.)
BSNOX G/KW HR (G/HP HR)	4.83 (3.60)(bag)
BSFC KG/KW HR (LB/HP HR)	.306 (.503)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.756 (26.71)
MULTIPLIER FOR	G/TEST	.852
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0929 (.0693)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3038 (.1378)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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TABLE A-3. ENGINE EMISSION RESULTS- BAG NO_x
H-TRANS.

PROJECT NO. 05-6590-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN4
DATE 8/19/81
TIME 1:30
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.65 MM HG(29.12 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-61. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	297.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5616.)	161.2 (5693.)	163.9 (5790.)	159.6 (5638.)
HC SAMPLE METER/RANGE/PPM	27.1/22/ 27.	32.8/22/ 33.	45.0/22/ 45.	29.1/22/ 29.
HC BCKGRD METER/RANGE/PPM	7.6/ 2/ 8.	6.7/ 2/ 7.	6.5/ 2/ 7.	6.3/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	34.1/13/ 31.	41.3/13/ 38.	53.5/13/ 51.	32.3/13/ 30.
CO BCKGRD METER/RANGE/PPM	.7/13/ 1.	.7/13/ 1.	.5/13/ 0.	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.1/ 3/ .43	38.6/ 3/ .65	87.8/ 3/ 1.63	26.2/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.7/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.9/ 2/ 21.	29.1/ 2/ 29.	75.3/ 2/ 75.	20.4/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.1/ 2/ 0.	.2/ 2/ 0.	.5/ 2/ 1.	.3/ 2/ 0.
DILUTION FACTOR	30.98	20.34	8.16	30.85
HC CONCENTRATION PPM	20.	26.	39.	23.
CO CONCENTRATION PPM	30.	37.	48.	28.
CO2 CONCENTRATION PCT	.38	.61	1.59	.39
NOX CONCENTRATION PPM	20.8	28.9	74.9	20.1
HC MASS GRAMS	1.81	2.46	3.71	2.12
CO MASS GRAMS	5.56	6.88	9.12	5.20
CO2 MASS GRAMS	1117.8	1803.9	4786.9	1135.9
NOX MASS GRAMS	6.33	8.91	23.47	6.14
FUEL KG (LB)	.353 (.78)	.569 (1.25)	1.502 (3.31)	.359 (.79)
KW HR (HP HR)	.96 (1.29)	1.65 (2.21)	5.57 (7.47)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.89 (1.41)	1.49 (1.11)	.67 (.50)	2.24 (1.67)
BSCO G/KW HR (G/HP HR)	5.79 (4.32)	4.18 (3.12)	1.64 (1.22)	5.49 (4.09)
BSCO2 G/KW HR (G/HP HR)	1164.12 (868.08)	1095.89 (817.21)	858.78 (640.40)	1198.60 (893.80)
BSNOX G/KW HR (G/HP HR)	6.59 (4.91)	5.42 (4.04)	4.21 (3.14)	6.48 (4.83)
BSFC KG/KW HR (LB/HP HR)	.368 (.605)	.345 (.568)	.269 (.443)	.379 (.623)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.13 (12.24)	
BSHC G/KW HR (G/HP HR)	1.11 (.83)	
BSCO G/KW HR (G/HP HR)	2.93 (2.19)	
BSCO2 G/KW HR (G/HP HR)	969. (723.)	
BSNOX G/KW HR (G/HP HR)	4.91 (3.66)	(bag)
BSFC KG/KW HR (LB/HP HR)	.305 (.501)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.768 (27.13)
MULTIPLIER FOR	G/TEST	.838
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0918 (.0685)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3011 (.1366)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN5
DATE 8/19/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.65 MM HG(29.12 IN HG)
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)

RELATIVE HUMIDITY , ENGINE-68. PCT , CVS-53. PCT
ABSOLUTE HUMIDITY 13.5 GM/KG(94.3 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)	218.4 (8.6)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3337.	3370.	3427.	3337.
TIME SECONDS	297.0	299.9	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.7 (5640.)	161.3 (5696.)	164.0 (5792.)	159.7 (5640.)
HC SAMPLE METER/RANGE/PPM	27.7/22/ 28.	33.8/22/ 34.	46.3/22/ 46.	30.1/22/ 30.
HC BCKGRD METER/RANGE/PPM	5.8/ 2/ 6.	8.8/ 2/ 9.	8.1/ 2/ 8.	7.9/ 2/ 8.
CO SAMPLE METER/RANGE/PPM	34.9/13/ 32.	42.7/13/ 40.	55.9/13/ 53.	31.8/13/ 29.
CO BCKGRD METER/RANGE/PPM	.4/13/ 0.	.6/13/ 1.	.6/13/ 1.	.8/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.7/ 3/ .42	38.4/ 3/ .65	89.3/ 3/ 1.66	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.4/ 3/ .04	2.6/ 3/ .04	2.5/ 3/ .04	2.5/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	20.5/ 2/ 21.	28.8/ 2/ 29.	77.5/ 2/ 78.	20.2/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.5/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	31.48	20.45	8.01	31.35
HC CONCENTRATION PPM	22.	25.	39.	22.
CO CONCENTRATION PPM	31.	39.	50.	28.
CO2 CONCENTRATION PCT	.38	.61	1.63	.38
NOX CONCENTRATION PPM	20.2	28.5	77.1	19.8
HC MASS GRAMS	2.03	2.36	3.71	2.06
CO MASS GRAMS	5.78	7.17	9.57	5.18
CO2 MASS GRAMS	1123.8	1802.3	4895.5	1124.6
NOX MASS GRAMS	6.17	8.80	24.17	6.05
FUEL KG (LB)	.355 (.78)	.568 (1.25)	1.536 (3.39)	.355 (.78)
KW HR (HP HR)	.97 (1.30)	1.67 (2.24)	5.59 (7.49)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	2.09 (1.56)	1.41 (1.05)	.66 (.49)	2.21 (1.65)
BSCO G/KW HR (G/HP HR)	5.95 (4.43)	4.29 (3.20)	1.71 (1.28)	5.54 (4.13)
BSCO2 G/KW HR (G/HP HR)	1155.41 (861.59)	1078.61 (804.32)	876.31 (653.47)	1202.45 (896.66)
BSNOX G/KW HR (G/HP HR)	6.35 (4.73)	5.26 (3.93)	4.33 (3.23)	6.47 (4.83)
BSFC KG/KW HR (LB/HP HR)	.365 (.601)	.340 (.559)	.275 (.452)	.380 (.625)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.17 (12.29)
BSHC G/KW HR (G/HP HR)	1.11 (.83)
BSCO G/KW HR (G/HP HR)	3.02 (2.25)
BSCO2 G/KW HR (G/HP HR)	976. (728.)
BSNOX G/KW HR (G/HP HR)	4.93 (3.68) (bag)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.763 (26.96)
MULTIPLIER FOR	G/TEST	.844
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0921 (.0687)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3000 (.1361)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x

H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-2 RUN6
DATE 8/19/81
TIME 2:50
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 739.39 MM HG(29.11 IN HG)
DRY BULB TEMP. 26.7 DEG C(80.0 DEG F)

RELATIVE HUMIDITY , ENGINE-56. PCT , CVS-59. PCT
ABSOLUTE HUMIDITY 12.7 GM/KG(88.6 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3369.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.0 (5617.)	161.1 (5689.)	163.9 (5788.)	159.6 (5636.)
HC SAMPLE METER/RANGE/PPM	29.2/22/ 29.	33.8/22/ 34.	45.9/22/ 46.	29.8/22/ 30.
HC BCKGRD METER/RANGE/PPM	8.6/ 2/ 9.	8.6/ 2/ 9.	6.8/ 2/ 7.	8.8/ 2/ 9.
CO SAMPLE METER/RANGE/PPM	37.8/13/ 35.	43.9/13/ 41.	57.5/13/ 55.	32.9/13/ 30.
CO BCKGRD METER/RANGE/PPM	2.7/13/ 2.	3.1/13/ 3.	2.8/13/ 3.	2.5/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	26.2/ 3/ .43	38.1/ 3/ .64	89.6/ 3/ 1.67	25.2/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.7/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	21.4/ 2/ 21.	28.9/ 2/ 29.	77.0/ 2/ 77.	19.5/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.6/ 2/ 1.	.7/ 2/ 1.	.6/ 2/ 1.
DILUTION FACTOR	30.81	20.62	7.98	32.13
HC CONCENTRATION PPM	21.	26.	38.	21.
CO CONCENTRATION PPM	32.	37.	50.	27.
CO2 CONCENTRATION PCT	.39	.60	1.63	.37
NOX CONCENTRATION PPM	20.9	28.3	76.4	18.9
HC MASS GRAMS	1.71	2.38	3.61	1.76
CO MASS GRAMS	5.89	6.97	9.52	5.09
CO2 MASS GRAMS	1131.8	1775.3	4898.6	1080.0
NOX MASS GRAMS	6.36	8.73	23.94	5.77
FUEL KG (LB)	.358 (.79)	.560 (1.23)	1.537 (3.39)	.341 (.75)
KW HR (HP HR)	.96 (1.29)	1.66 (2.22)	5.57 (7.47)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.99 (1.49)	1.44 (1.07)	.65 (.48)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	6.14 (4.58)	4.20 (3.13)	1.71 (1.27)	5.37 (4.00)
BSCO2 G/KW HR (G/HP HR)	1178.71 (878.96)	1070.43 (798.22)	878.82 (655.34)	1139.54 (849.76)
BSNOX G/KW HR (G/HP HR)	6.63 (4.94)	5.26 (3.92)	4.30 (3.20)	6.09 (4.54)
BSFC KG/KW HR (LB/HP HR)	.373 (.613)	.337 (.555)	.276 (.453)	.360 (.592)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.14 (12.26)	
BSHC G/KW HR (G/HP HR)	1.08 (.81)	
BSCO G/KW HR (G/HP HR)	3.01 (2.24)	
BSCO2 G/KW HR (G/HP HR)	972. (725.)	
BSNOX G/KW HR (G/HP HR)	4.90 (3.66)	(bag)
BSFC KG/KW HR (LB/HP HR)	.306 (.503)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.761 (26.87)
MULTIPLIER FOR	G/TEST	.846
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0925 (.0690)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.3026 (.1372)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
C-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN1
DATE 8/20/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 741.17 MM HG(29.18 IN HG)
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)

RELATIVE HUMIDITY , ENGINE-71. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 13.1 GM/KG(91.9 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS				
BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	157.4 (5629.)	161.5 (5705.)	164.3 (5802.)	160.0 (5650.)
HC SAMPLE METER/RANGE/PPM	58.6/22/ 59.	46.3/22/ 46.	50.3/22/ 50.	29.7/22/ 30.
HC BCKGRD METER/RANGE/PPM	7.3/ 2/ 7.	7.1/ 2/ 7.	7.0/ 2/ 7.	6.8/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	67.6/13/ 66.	49.0/13/ 46.	56.0/13/ 53.	31.4/13/ 29.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.	1.1/13/ 1.	1.4/13/ 1.	1.5/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	28.8/ 3/ .47	39.8/ 3/ .67	89.4/ 3/ 1.67	25.8/ 3/ .42
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	3.1/ 3/ .05	3.0/ 3/ .05	3.0/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	22.2/ 2/ 22.	29.2/ 2/ 29.	76.5/ 2/ 77.	20.7/ 2/ 21.
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ 1.	.5/ 2/ 1.	.6/ 2/ 1.	.5/ 2/ 1.
DILUTION FACTOR	27.54	19.62	8.00	31.36
HC CONCENTRATION PPM	52.	40.	44.	23.
CO CONCENTRATION PPM	63.	44.	49.	27.
CO2 CONCENTRATION PCT	.43	.63	1.63	.38
NOX CONCENTRATION PPM	21.7	28.7	76.0	20.2
HC MASS GRAMS	4.74	3.69	4.19	2.13
CO MASS GRAMS	11.61	8.21	9.44	4.98
CO2 MASS GRAMS	1259.7	1860.7	4870.1	1104.7
NOX MASS GRAMS	6.62	8.88	23.87	6.19
FUEL KG (LB)	.403 (.89)	.588 (1.30)	1.535 (3.38)	.349 (.77)
KW HR (HP HR)	.99 (1.32)	1.65 (2.21)	5.64 (7.56)	.94 (1.25)
BSHC G/KW HR (G/HP HR)	4.81 (3.59)	2.24 (1.67)	.74 (.55)	2.28 (1.70)
BSCO G/KW HR (G/HP HR)	11.79 (8.79)	4.99 (3.72)	1.67 (1.25)	5.33 (3.97)
BSCO2 G/KW HR (G/HP HR)	1278.72 (953.54)	1130.43 (842.96)	867.59 (646.96)	1181.16 (880.79)
BSNOX G/KW HR (G/HP HR)	6.72 (5.01)	5.39 (4.02)	4.24 (3.16)	6.61 (4.93)
BSFC KG/KW HR (LB/HP HR)	.410 (.673)	.357 (.588)	.272 (.448)	.373 (.614)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.20 (12.34)	
BSHC G/KW HR (G/HP HR)	1.60 (1.19)	
BSCO G/KW HR (G/HP HR)	3.72 (2.77)	
BSCO2 G/KW HR (G/HP HR)	990. (739.)	
BSNOX G/KW HR (G/HP HR)	4.95 (3.69)	(bag)
BSFC KG/KW HR (LB/HP HR)	.312 (.514)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.748 (26.43)
MULTIPLIER FOR	G/TEST	.862
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0937 (.0699)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2998 (.1360)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN1
DATE 8/20/81
TIME 10:20
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 741.43 MM HG(29.19 IN HG)
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)

RELATIVE HUMIDITY , ENGINE-58. PCT , CVS-69. PCT
ABSOLUTE HUMIDITY 11.8 GM/KG(82.8 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3326.	3369.	3427.	3343.
TIME SECONDS	296.0	299.9	305.0	297.5
TOTAL FLOW STD. CU. METRES(SCF)	159.5 (5633.)	161.6 (5706.)	164.3 (5804.)	160.3 (5662.)
HC SAMPLE METER/RANGE/PPM	26.8/22/ 27.	32.1/22/ 32.	44.8/22/ 45.	28.3/22/ 28.
HC BCKGRD METER/RANGE/PPM	6.6/ 2/ 7.	6.6/ 2/ 7.	6.6/ 2/ 7.	6.5/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	34.3/13/ 32.	41.6/13/ 39.	54.9/13/ 52.	30.1/13/ 28.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.2/13/ 1.	1.2/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	25.6/ 3/ .42	38.1/ 3/ .64	88.0/ 3/ 1.64	24.9/ 3/ .41
CO2 BCKGRD METER/RANGE/PCT	2.9/ 3/ .04	2.9/ 3/ .04	2.9/ 3/ .04	2.8/ 3/ .04
NOX SAMPLE METER/RANGE/PPM	21.1/ 2/ 21.	29.4/ 2/ 29.	75.7/ 2/ 76.	19.5/ 2/ 20.
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ 0.	.4/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	31.62	20.63	8.14	32.57
HC CONCENTRATION PPM	20.	26.	39.	22.
CO CONCENTRATION PPM	30.	36.	48.	26.
CO2 CONCENTRATION PCT	.38	.60	1.60	.36
NOX CONCENTRATION PPM	20.7	29.0	75.2	19.1
HC MASS GRAMS	1.88	2.41	3.70	2.03
CO MASS GRAMS	5.52	6.86	9.27	4.82
CO2 MASS GRAMS	1095.6	1776.2	4807.7	1069.7
NOX MASS GRAMS	6.32	8.97	23.63	5.86
FUEL KG (LB)	.346 (.76)	.560 (1.23)	1.508 (3.33)	.338 (.75)
KW HR (HP HR)	.97 (1.30)	1.66 (2.22)	5.61 (7.53)	.96 (1.29)
BSHC G/KW HR (G/HP HR)	1.93 (1.44)	1.45 (1.08)	.66 (.49)	2.12 (1.58)
BSCO G/KW HR (G/HP HR)	5.67 (4.23)	4.13 (3.08)	1.65 (1.23)	5.02 (3.74)
BSCO2 G/KW HR (G/HP HR)	1126.43 (839.98)	1070.96 (798.62)	856.76 (638.89)	1114.04 (830.74)
BSNOX G/KW HR (G/HP HR)	6.50 (4.84)	5.41 (4.03)	4.21 (3.14)	6.10 (4.55)
BSFC KG/KW HR (LB/HP HR)	.356 (.586)	.338 (.555)	.269 (.442)	.352 (.579)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.20 (12.34)	
BSHC G/KW HR (G/HP HR)	1.09 (.81)	
BSCO G/KW HR (G/HP HR)	2.88 (2.14)	
BSCO2 G/KW HR (G/HP HR)	951. (709.)	
BSNOX G/KW HR (G/HP HR)	4.87 (3.63)	(bag)
BSFC KG/KW HR (LB/HP HR)	.299 (.492)	

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER

SAMPLE FLOW	SCM(SCF)	.783 (27.66)
MULTIPLIER FOR	G/TEST	.825
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0896 (.0668)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2995 (.1359)

20 X 20 FILTERS

SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

TABLE A-3. ENGINE EMISSION RESULTS - BAG NO_x
H-TRANS.

PROJECT NO. 05-6598-001

ENGINE NO.D-31
ENGINE MODEL 81 IH DTI-466B
ENGINE 7.6 L(466. CID) I-6
CVS NO. 10

TEST NO.D31-3 RUN2
DATE 8/20/81
TIME
DYNO NO. 5

DIESEL EM-477-F
BAG CART NO. 1

BAROMETER 740.41 MM HG(29.15 IN HG)
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)

RELATIVE HUMIDITY , ENGINE-55. PCT , CVS-65. PCT
ABSOLUTE HUMIDITY 11.6 GM/KG(81.2 GRAINS/LB) NOX HUMIDITY C.F. 1.0000

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	NYNF	LANF	LAF	NYNF
BLOWER DIF P MM. H2O(IN. H2O)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)	221.0 (8.7)
BLOWER INLET P MM. H2O(IN. H2O)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)	165.1 (6.5)
BLOWER INLET TEMP. DEG. C(DEG. F)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)	48.9 (120.0)
BLOWER REVOLUTIONS	3325.	3370.	3427.	3337.
TIME SECONDS	296.0	300.0	305.0	297.0
TOTAL FLOW STD. CU. METRES(SCF)	159.2 (5623.)	161.4 (5699.)	164.1 (5796.)	159.8 (5644.)
HC SAMPLE METER/RANGE/PPM	25.9/22/ 26.	31.2/22/ 31.	45.1/22/ 45.	28.0/22/ 28.
HC BCKGRD METER/RANGE/PPM	7.0/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.	7.0/ 2/ 7.
CO SAMPLE METER/RANGE/PPM	34.7/13/ 32.	41.9/13/ 39.	57.2/13/ 55.	32.2/13/ 30.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.3/13/ 1.	1.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	26.2/ 3/ .43	38.9/ 3/ .66	90.6/ 3/ 1.69	26.3/ 3/ .43
CO2 BCKGRD METER/RANGE/PCT	3.2/ 3/ .05	3.2/ 3/ .05	3.2/ 3/ .05	3.1/ 3/ .05
NOX SAMPLE METER/RANGE/PPM	20.7/ 2/ 21.	30.0/ 2/ 30.	78.1/ 2/ 78.	20.7/ 2/ 21.
NOX BCKGRD METER/RANGE/PPM	.3/ 2/ 0.	.3/ 2/ 0.	.6/ 2/ 1.	.4/ 2/ 0.
DILUTION FACTOR	30.86	20.17	7.88	30.74
HC CONCENTRATION PPM	19.	24.	39.	21.
CO CONCENTRATION PPM	30.	37.	51.	27.
CO2 CONCENTRATION PCT	.38	.61	1.65	.38
NOX CONCENTRATION PPM	20.4	29.7	77.6	20.3
HC MASS GRAMS	1.75	2.28	3.69	1.96
CO MASS GRAMS	5.58	6.91	9.68	5.11
CO2 MASS GRAMS	1111.3	1804.9	4952.7	1124.8
NOX MASS GRAMS	6.22	9.17	24.35	6.21
FUEL KG (LB)	.351 (.77)	.569 (1.25)	1.554 (3.43)	.355 (.78)
KW HR (HP HR)	.96 (1.29)	1.66 (2.22)	5.65 (7.58)	.95 (1.27)
BSHC G/KW HR (G/HP HR)	1.83 (1.36)	1.37 (1.03)	.65 (.49)	2.07 (1.54)
BSCO G/KW HR (G/HP HR)	5.81 (4.34)	4.17 (3.11)	1.71 (1.28)	5.39 (4.02)
BSCO2 G/KW HR (G/HP HR)	1157.36 (863.04)	1088.28 (811.53)	876.76 (653.80)	1186.88 (885.05)
BSNOX G/KW HR (G/HP HR)	6.47 (4.83)	5.53 (4.12)	4.31 (3.21)	6.55 (4.89)
BSFC KG/KW HR (LB/HP HR)	.366 (.601)	.343 (.564)	.275 (.452)	.375 (.617)

TOTAL TEST RESULTS 4 BAGS

TOTAL KW HR (HP HR)	9.22 (12.36)
BSHC G/KW HR (G/HP HR)	1.05 (.78)
BSCO G/KW HR (G/HP HR)	2.96 (2.21)
BSCO2 G/KW HR (G/HP HR)	976. (728.)
BSNOX G/KW HR (G/HP HR)	4.99 (3.72) (bag)
BSFC KG/KW HR (LB/HP HR)	.307 (.505)

PARTICULATE DATA, TOTAL FOR 4 BAGS

90MM FILTER		
SAMPLE FLOW	SCM(SCF)	.766 (27.05)
MULTIPLIER FOR	G/TEST	.842
MULTIPLIER FOR	G/KW HR (G/HP HR)	.0913 (.0681)
MULTIPLIER FOR	G/KG FUEL (G/LB FUEL)	.2975 (.1349)
20 X 20 FILTERS		
SAMPLE FLOW	SCM(SCF)	0.00 (0.0)

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